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No. 267



THE WESTERN RED CEDAR

The American Forestry Association

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Declaration of Principles and Policy of The American Forestry Association

IT IS A VOLUNTARY organization for the inculcation and spread of a forest policy on a scale adequate for our economic needs, and any person is eligible for membership.

IT IS INDEPENDENT, has no official connection with any Federal or State department or policy, and is devoted to a public service conducive to national prosperity.

IT ASSERTS THAT forestry means the propagation and care of forests for the production of timber as a crop; protection of watersheds; utilization of non-agricultural soil; use of forests for public recreation.

IT DECLARES THAT FORESTRY is of immense importance to the people; that the census of 1913 shows our forests annually supply over one and a quarter billion dollars' worth of products; employ 735,000 people; pay \$367,000,000 in wages; cover 550,000,000 acres unsuited for agriculture; regulate the distribution of water; prevent erosion of lands; and are essential to the beauty of the country and the health of the nation.

IT RECOGNIZES THAT forestry is an industry limited by economic conditions; that private owners should be aided and encouraged by investigations, demonstrations, and educational work, since they cannot be expected to practice forestry at a financial loss; that Federal and State governments should undertake scientific forestry upon national and State forest reserves for the benefit of the public.

IT WILL DEVOTE its influence and educational facilities to the development of public thought and knowledge along these practical lines.

It Will Support These Policies

National and State Forests under Federal and State Ownership, administration and management respectively; adequate appropriations for their care and management; Federal cooperation with the States, especially in forest fire protection.

State Activity by acquirement of forest lands; organization for fire protection; encouragement of forest planting by communal and private owners, non-political departmentally independent forest organization, with liberal appropriations for these purposes.

Forest Fire Protection by Federal, State and fire protective agencies, and its encouragement and extension, individually and by cooperation, without adequate fire protection all other measures for forest crop production will fail.

Forest Planting by Federal and State governments and long-lived corporations and acquirement of waste lands for this purpose; and also planting by private owners, where profitable, and encouragement of natural regeneration.

Forest Taxation Reforms removing unjust burdens from owners of growing timber.

Closer Utilization in logging and manufacturing without loss to owners; aid the lumbermen in achieving this.

Cutting of Mature Timber where and as the domestic market demands it, except in areas maintained for park or scenic purposes, and compensation of forest owners for loss suffered through protection of watersheds, or on behalf of any public interest.

Equal Protection to the lumber industry and to public interests in legislation affecting private timberland operations, recognizing that lumbering is as legitimate and necessary as the forests themselves.

Classification by experts of lands best suited for farming and those best suited for forestry; and liberal national and State appropriations for this work.

AMERICAN FORESTRY

The Magazine of the American Forestry Association

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Shall Stumpage be an INVESTMENT, a Speculation or a "Gamble?"

All investment in timberland, unless for immediate logging operations is, technically speaking, speculation — because profits depend on Increase in value. All good timberland is steadily and rapidly appreciating in value, so that the only thing which stands between the investor in timberland and a sure profit is the question as to whether a tract actually contains the stumpage on which the purchase price is based.

The best "cruising" of timber after the old-fashioned method (or non-method) introduces a factor of possible error so great that the purchase often becomes nothing short of a "gamble." Everyone knows of case after case where a buyer has met heavy losses—often without any intent to deceive on the part of the seller.

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Western Red Cedar

Identification and Characteristics

BY SAMUEL B. DETWILER

ENTHUSIASTS have called western red cedar "the world's overcoat wood," because its wood has extraordinary ability to resist decay. Another name, "Shinglewood," is appropriate, because it is the greatest shingle wood in the United States, furnishing more shingles than all other American species combined. It is widely known in the West as "canoe cedar," because the Indians of the Pacific Coast used it in making immense canoes. War canoes, made with crude implements from a single cedar log, were often sixty feet or more in length, eight feet across at the widest point, and capable of carrying a load upward of thirty tons. So faultless were the lines of these craft, when made in the perfection of the Indian's art, that canoes taken to the Atlantic Coast by early traders became the models from which Boston and New York shipbuilders constructed the famous clipper ships. The West Coast Indians still fashion cedar "dug-outs" of a beauty and symmetry surpassing the canoes made by white men.

The wood is soft, straight-grained, and easily worked, so durable and little subject to checking, that the sav-



THE WESTERN RED CEDAR

Showing the characteristic appearance of the foliage, cones, and seeds of the western red cedar. The small, scale-like leaves overlap each other so as to completely cover the flat twigs. The brownish cones (a) are borne in dense clusters or several together. They are composed of a few overlapping scales, which spread apart when the cones are ripe and liberate the tiny pale-brown seeds (b, natural size and enlarged three times), which bear a very thin, paper-like wing on two sides. The wings assist greatly in disseminating the seeds.

ages found it admirably fitted to their primitive needs. With rude tools of stone, bone and shell, they split it into beams and boards. From the fibrous inner bark they manufactured blankets, ropes, dog harness, fishing lines, mats and baskets. They even baked the beaten pulp of the innermost bark and served it with salmon oil as an article of food. Western red cedar is, in truth, the "family tree" of the "Siwash" Indians, for from it they have carved most of their massive totem poles, which sometimes exceed in size the great columns of European cathedrals. These weird emblems, fantastic family crests, so to speak, are sometimes forty to fifty feet high, and are skilfully hewed into grotesque figures of men and beasts so cleverly and strikingly colored that they never fail to attract the attention of the beholder.

Next to Douglas fir, Western red cedar is the most important timber tree of the northern Pacific Coast. Experts estimate that it comprises about one-third of the forest resources of British Columbia and one-eighth of the standing timber in the State of Washington. As a lumber-producing tree,

it is most important in southwestern British Columbia, the coast region of western Washington and other Western sections.

Cedar, a name of very ancient origin, meaning "life from the dead," has been applied to many unrelated kinds of wood which possess the one common characteristic of exceptional durability. The "Cedar of Lebanon" supplied the timbers for Solomon's temple, and the Egyptians used cedar oil for preserving mummies, and the wood for mummy cases. Carved figures of cedar, supposed to be more than three thousand years old, may be seen in the museums of today. In the United States, red cedar, incense cedar, southern white cedar, northern white cedar, and cypress are genera which have one or more species commonly known as "cedar," although in some cases this term is a local one only. Two species of *Arborvitae* are native to America, one being the white cedar of the northeastern United States, and the other western red cedar, sometimes called the giant *Arborvitae* or gigantic cedar.

Giant *Arborvitae*, like so many of the Pacific Coast trees, attains magnificent proportions. In the low fertile bottom lands near Puget Sound and Vancouver Island, specimens 200 feet high and 15 or 16 feet in diameter have been found. Its ordinary size is from 3½ to 8 feet in diameter with a height of 100 to 150 feet. A prominent feature that gives this tree a very different appearance from other trees of the Pacific Coast is the rapid tapering of the trunk from a greatly enlarged and fluted base. A tree 15 feet in diameter near the ground is usually only 9 or 10 feet through 20 above. Young trees do not have excessively swollen or furrowed bases, and are regular in outline, making splendid poles. Practically all of the very old trees are hollow at the center for a considerable distance above the base.

Like most evergreen trees, when growing in the open, western cedar retains living branches almost to the ground, forming a stately and symmetrical spire of green.



A WESTERN RED CEDAR, ANGELES NATIONAL FOREST, CALIFORNIA

Next to Douglas fir, the cedar is the most important timber tree in British Columbia and in the State of Washington. It grows over an area of about 300,000 square miles.

from young trees in ribbons 20 or 30 feet long.

Like the eastern *Arborvitae*, the leaves are tiny scale-like affairs that overlap each other and press closely to the twigs. The latter are noticeably flat, branching and rebranching into open, fernlike fans of pale green that delight the eye. The leaves remain on the tree about three years; as the main stems of the branch develop, the short, flat side branches also die and fall.

Both the pollen-producing and the seed-forming flowers are borne on the same tree, but usually on different twigs. They are very small, brown, scaly bodies that bloom inconspicuously in the early spring. The clustered russet-brown cones are about one-half inch long and stand erect upon the branches. They consist of a few thin leathery scales arranged in pairs, the three middle pairs are larger than the others and each bears two or three seeds. The seeds are very small and light, with a pleasing aromatic odor. Each seed has thin gauzy wings on either side and almost surrounding it, instead of a single long wing at the end, as is the case with the seeds of most cone-bearing trees. The cones begin

Trees growing in dense forests are free of branches for 40 to 80 feet above the ground, and the matured trunks usually are slightly curved. Young trees have slender, upcurving limbs, but as the branches grow in length they swing down in graceful curves, with an upward sweep of the ends. The top of a vigorously growing youthful cedar ends in a slender, nodding, whiplike tip. Not infrequently two tips—a "double leader"—are formed, causing a fork in the stem of the tree. As the trees grow in age they gradually develop rounding tops.

The bark is less than an inch thick, even on the large trees. In color it is bright cinnamon red, but the exterior is frequently a grayish brown from long exposure to the weather. Shallow seams separate the surface of the bark into narrow strips that extend irregularly, but continuously, the length of the trunk. These bands of bark are flat on young trees, but on older trees they become rounded. The inner bark is tough and fibrous, and can be peeled



THIS LOG HAS BEEN ON THE GROUND OVER 1,500 YEARS

A thousand years before Columbus discovered America the red cedar which the woodsman is seen cutting fell to the ground. Since then the three big cedar trees grew over it, reached great size, and were cut down. The largest of the three was 10½ feet in diameter, and showed an average of 23 rings to the inch, making it 1,449 years old. The fallen tree was found by the woodsman to be thoroughly sound and well-preserved, as he cut out of it numerous shingle bolts.

to open in August and the seeds sail away on the wind like tiny aeroplanes, scattering far and wide. A single tree produces thousands upon thousands of seeds each year, and at intervals of a few years extra large crops are borne. The seed must start to grow quickly or it loses its ability to germinate. It grows best in moist places, such as beds of moss or on decaying logs and stumps.

Nature has made it easy for the seeds to travel and they are produced so abundantly that young growth of western red cedar is plentiful in the regions of heavy rainfall, where this tree grows best, except where forest fires have wrought havoc by destroying the blanket of moss and vegetable mould that holds the moisture in the ground. Very few young red cedars are found where forest fires have destroyed vegetation and exposed the dry mineral soil. The seedlings have remarkable power to thrive in dense shade and will grow even to old age overshadowed by other trees. However, growth is more rapid where the trees receive plenty of sunlight. In dense forests old cedars have been found that have required more than 50 years to grow a single inch. Average growth is about one inch in radius in 10 years, but trees that have grown one-half inch per year for 20 successive years have been found. Some of the largest trees are 700 to 800 years old, or perhaps older.

Like other forest trees, the character of its growth

and its relative abundance in the forest varies with soil and moisture conditions and elevation above sea level. In swamps and swales it is sometimes the only evergreen tree in the forest, but such areas of pure growth are of limited size. It is generally found growing with western hemlock, Douglas fir, redwood, western white pine and other species. It is less common on dry southern slopes than on the moist north and east slopes, where it is found growing at greater elevations than on the southern exposures. It will grow on dry rocky soil, but does not develop well. Although it climbs the mountains to the height of more than a mile above sea level, near its upper limits it grows short and stunted, and at present is of little commercial importance above 3,000 feet elevation. At high altitudes, where the summers are short and the winter temperatures sometimes reach 35 degrees below zero, it becomes a mere shrub.

In the "cedar country" of British Columbia this species may constitute 50 per cent to 80 per cent of the merchantable timber. On selected areas the cedar logs cut from a single acre may scale 100,000 feet board measure, but such heavy stands are not often found. A good yield where cedar predominates is 80,000 to 60,000 board feet per acre.

The wood has about three-fourths of the strength and stiffness of white oak, and is light and soft. The heart wood is a dull reddish-brown, darkening on exposure;

the sapwood is narrow, and nearly white. The wood has a spicy odor, and, when polished, takes on a beautiful soft glossy finish. Durability is the quality that has made this wood famous. Oliver Wendell Holmes knew the qualities of cedar in general when he wrote:

" . . . the fair cedar, fallen before the breeze,
Lies self embalmed amidst the mouldering trees."

These lines seem especially to apply to western red cedar, trees that fell centuries before Columbus discovered America still lie in the forest as sound at heart as ever.

The worst enemy of western red cedar is fire. The bark of trees of all ages is so extremely thin that they

are easily killed by fire, and even a light ground fire causes scars through which the powder worms enter and bore through living cedars, as they sometimes do in dead ones.

The giant Arborvitae far exceeds our native eastern species both in beauty and rapidity of growth. It has been planted in England to some extent for ornamental purposes, where it grows well and forms a handsome tree. In the northeastern United States the Pacific Coast form does not thrive, and only trees grown from Montana or Idaho seed should be planted. Trees from Pacific Coast seed will grow in sections of the southeastern states where moisture and soil conditions are favorable.

Commercial Uses of Western Red Cedar

By H. P. WYCKOFF

GO into any State in the Union—North, East, South or West, and you will find on the homes of the most magnificent dwellings, the humblest cottages and the whole range between, the Red Cedar shingle. Nature, in her own good way, has given to the world a wood so perfectly adapted to be made into a covering that it has been universally adopted, and the man in New York, Florida, California, Washington, the Dakotas, Iowa or any other State in the Union, when he is ready to build, will draw on the old cedar tree.

Its commercial range in the United States may be

divided into two regions: The "Inland Empire" region of western Montana, northern Idaho, and eastern Washington; and the west coast region of western Washington and northwestern Oregon. It ranges from southeastern Alaska to northern California, and eastward through southeastern British Columbia and northern Washington to northern Idaho and Montana.

In Alaska it is confined to the islands and the ocean side of the coast ranges from sea level to 3,000 feet. In British Columbia it occurs on the islands and extends along the Coast ranges up to 2,400 feet, also occurring

along the slopes of the southern Gold and Selkirk Mountains, and on the west side of the Continental Divide up to 6,000 feet. In the United States the species occurs abundantly in the forests of the Olympic Mountains, coast ranges, and west slopes of the Cascades, but here rarely extends above 4,000 feet. On the east slope of the Cascades and in the northeastern part of Washington it is less abundant, and here is found chiefly between altitudes of 1,500 and 4,500 feet. In Oregon it inhabits both sides of the Coast ranges and the west side of the Cascades only, reaching from sea level to 5,000 feet, and in one instance to even 7,000 feet. In California it is not common, and is confined to the sea side of the coast ranges within the fog belt. In northern Idaho it is plentiful in the humid for-



THE FAMOUS RED CEDAR SHINGLES

The great percentage of red cedar is used for shingles, the wood being peculiarly adaptable for this purpose. There is a market for each and every grade of this shingle.



WESTERN RED CEDAR AS A RESIDENCE

Near Seattle, Washington, an enormous red cedar stump has been made into a home for a fairly large family. It is roofed over with shales, split shingles, also of red cedar. The stump was originally used as the postoffice of the county in which it is located, serving in this capacity for a number of years before it was turned into a residence.

ests of the "panhandle" and reaches its eastern limit in western Montana.

Its local distribution is confined to regions of plentiful precipitation, and chiefly to wet or constantly moist situations. In the Puget Sound region it occurs chiefly in river bottoms, on moist flats, in and around swamps, on benches and gentle slopes and in cool, moist gulches and ravines.

It does not occur in the dry basin between the Cascades and the Rocky Mountains in either Oregon or Washington, but reappears abundantly in the humid forest region of the "Inland Empire" in northeastern Washington and northern Idaho.

The western red cedar can be used for a great many different purposes, but the most valuable characteristics are its lightness and durability. This makes it exceptionally valuable for fences, posts, poles, certain classes of piling, also certain forms of lumber, but especially for shingles. Probably 75 per cent of all the cedar cut goes into shingles, the other 25 per cent going to the various uses named.

Through the sections of the country where cedar thrives there are many examples of the durability of this wood. Almost any place along the waters of the Pacific

Coast, from Oregon to Alaska, one may find the old Indian canoe made of red cedar. The old block houses built by the Indians were of red cedar. One on San Juan Island, built in the year 1856, is roofed with red cedar shingles. This roof today is in perfect condition.

Near Seattle, Washington, is the home of a fairly large family which is built in an enormous cedar stump which has been roofed over with shales (split shingles). This stump was originally used for the postoffice of the county in which it is located, serving in this capacity for a number of years before it was turned into its present mission.

There is also, or was until very recent years, a remarkable example of the durability of a cedar log which had laid on the ground for at least 1,500 years. After the original tree had fallen, three other cedar trees had grown over it. These cedars in turn reached a remarkable size, and were cut down. The largest of these trees was 10½ feet in diameter and showed an average of 23 rings to the inch. This would mean that this particular tree was 1,449 years old and during all these years the log had laid there during alternate wet and dry seasons and endured the most favorable conditions for decay. At the time the picture, which you see in

this article, was taken, a woodsman was cutting shingle bolts out of this oldtimer and these bolts were just as sound as the day when the log was in its prime.

There is one special case of an old home which now stands near Tacoma, Washington. The roof of this

home, built of sawed red cedar shingles, is 30 years old and never has been painted. This roof is still in perfect condition, with the exception of a few loose shingles, the result of the nails having rusted off. The owner of this place says that had the proper nails been used the roof would be good for ten or fifteen years more. It is this exceptionally remarkable durability, together with the lightness and the ease with which the timber is worked, that makes red cedar unequaled anywhere for shingle material. Nature has done all she can on the raw material and has left the manufacturing to the mortal.

POLES, PILING, FENCE POSTS AND LUMBER

Cedar is employed for uses where lightness and durability are required rather than strength. The combined assets of size and durability make cedar exceptionally adaptable for telephone poles, some kinds of piling, and fence posts. It is almost impossible to put any kind of timber in the ground without its decaying in a very, very short time at the ground line. This is due to the fact that you have at this point light, heat, and alternate wetting and drying, which are the essential qualifications to promote decay. The suitable taper of the tree and the pole lengths obtainable, together with the durability, have caused western red cedar to become the standard pole timber.

Red cedar is used to some certain extent in lumber. This refers particularly to the red cedar siding. Again is found a use where durability and lightness are the essential features. There are also two other characteristics of the red cedar which make it particularly adaptable for this use. These are the slight shrinkage and expansion due to different moisture conditions of the wood; also the ease with which this timber will take nails without splitting. Only a small percentage of cedar used goes for these combined purposes. The big majority is used in cedar shingles.

Any product which is furnished by nature is necessarily produced in different grades; apples, berries, nuts, vegetables come in different stages of perfection. It is no different with cedar. The raw material develops in different grades due to different localities, different climatic conditions, different altitudes and various other agencies, and there are defects such as knots, poor grain, inferior growth, etc. In order to put the manufacture of shingles on a practical basis, it is necessary to make grades which include some of these defects, the percentage of high and low grades depending very much upon the timber. There is a market for each and every grade of shingles. Temporary buildings, such as sheds, play houses, tool houses and any and all temporary structures, should logically use the cheap or poorer grade of shingles. Permanent



Copyrighted photograph by Darius Kinsey.

TUNNEL THROUGH A WESTERN RED CEDAR

This gives an excellent idea of the size of these trees, and also of the shaggy bark which renders their identification so easy. The tree stands along a roadside in the State of Washington.

structures should not consider anything other than high-class grades. A shingle need not be absolutely clear to be first class. It might have minor defects in the tip without injuring the grade of the shingle one iota, but it should be free from sap and practically vertical grain. It is like throwing cold water in the face of the word "conservation" to advocate the use of only absolutely clear shingles. There is a use for all grades of shingles and the greatest task that the manufacturer has today, in order to put his business on a permanent

foundation, is to educate the consumer on the proper grades to use on the proper place.

The shingle manufacturers also have another very important task on their hands to correct the false impression on the part of the general public regarding the fire risk of shingles. This impression is largely due to competitors of wooden shingles.

The cedar tree does not claim preeminence where strength is required, but it does claim unexcelled recognition for durability and lightness.

The White-Pine Blister Rust Situation

BY DR. PERLEY SPAULDING
Pathologist, U. S. Department of Agriculture

IN AMERICAN FORESTRY for February attention was called to the serious disease of white pines which was introduced some years ago from Europe. A colored plate was also printed showing the different stages of this disease upon white pines and the leaves of currants and gooseberries. Herewith is a diagram indicating the complete life history of the parasite causing this disease. The arrows show the transfer of the disease from one plant to the next.

Figure 1 is the spring stage of the disease as it breaks out upon the infected white pines. Immense numbers of very minute dustlike yellow spores (seeds) are produced upon the pine. These are blown about by the wind and fall upon the leaves of any currants or gooseberries that may be in the vicinity. On these leaves, Figure 2, they germinate and send the root into the soft portions of the leaf. Two weeks later a second crop of spores is produced upon the leaf. The disease then may do one of two things—it may produce a second generation of the same kind of spores, as indicated in Figure 3, or there may be produced a distinct form of disease as shown in Figure 4.

The form shown upon Figures 2 and 3 may be called the yellow summer stage. This is capable of repeating itself every two weeks until the end of the season. This is the stage where the disease spreads rapidly upon currants and gooseberries. It is very easy to see that if the disease advances 200 feet with each generation of spores produced, by the end of the season it may have progressed a very considerable distance from the pine which started the disease early in the spring. The brown autumn form of the disease shown in Figure 4 may be found from the latter part of July until the leaves have fallen. Upon the rather stout brown hairs is produced a third form of spores. These spores in turn, instead of spreading the disease upon currants or gooseberries are able to attack only the young bark of white pine. In this way the complete life cycle of the parasite from pine to currant or gooseberry and then back to white pine takes place during a single summer. The disease, however, does not show upon the newly infected white pines until one or more years later.

Any planting of white pine done from this time onward

should be made with trees secured under the following conditions. The person supplying them should be required to furnish a written guarantee that his stock fulfills the following conditions:

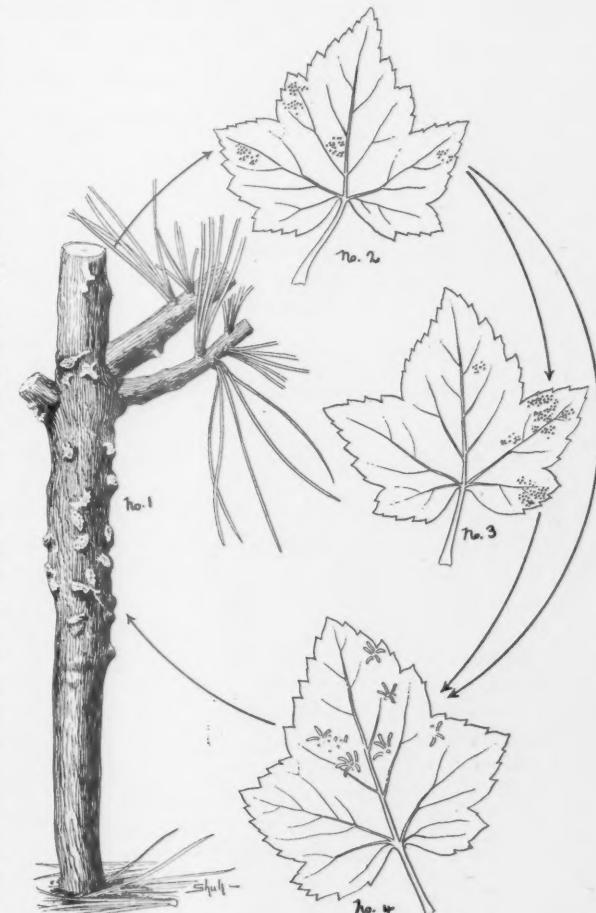


DIAGRAM SHOWING PROGRESS OF WHITE PINE BLISTER RUST

- No. 1. The pine infected with the blister rust, showing condition as found in the spring.
 No. 2. The currant, or gooseberry, leaf, showing the second stage of the disease, resulting from infection with the spores from a pine.
 No. 3. Currant or gooseberry leaf, showing second generation of second stage of the disease, the result of infection of spores from currant or gooseberry leaves.
 No. 4. The third spore stage on currant and gooseberry leaves, the condition being that in which it is transmitted to the pine trees.

1. It was raised from seed in the nursery of the person from whom it was purchased.
2. It was raised in a nursery which contains no imported 5-needed pines nor imported currants or gooseberries.
3. It was raised in a nursery which is, and has always been, free from white pine blister rust on 5-needed pines and on currants or gooseberries. These conditions and these only will insure absolute freedom from this disease. A certificate of inspection showing that the disease is not now present in the nursery is valueless, because it is absolutely impossible to determine the freedom of a nursery by inspection alone.

If you have a general interest in the preservation of the white pines of your vicinity, communicate with your state officials and legislators, calling attention to this serious trouble and the desirability of immediate and efficient action against it. The matter of the placing of a state quarantine with reference to this disease is one which should be seriously considered, especially by those states which are not known to have any of the disease. On February 4 the Federal Horticultural Board of the United States Department of Agriculture held a hearing concerning the advisability of placing a federal quarantine upon the shipment of all 5-leaved pines and of cultivated black currants from the states in which the disease is now known to be present. It is very probable that some means of controlling the shipment of such stock will be put in force. Attention should be called, however, to the fact that the disease may later be found in almost any other state of the country. It is therefore very desirable that each of the states protect itself by local action so far as is possible.

NORTH CAROLINA'S MEETING

AT the Sixth Annual Convention of the North Carolina Forestry Association, held in Newbern, N. C., Mr. C. L. Ives, president of the Newbern Chamber of Commerce, in welcoming the delegates, referred to the fact that it was there that the North Carolina State Forestry Association was formed eighteen years ago. Mr. Ives himself was elected president at that time, and the main question then discussed was of securing protection against forest fires. President Nathan O'Berry, who is also president of the North Carolina Pine Association, dealt, in his annual address, on the great need for educational and propaganda work. He appealed to the lumbermen and timberland owners to support the movement and said: "When you consider that in eastern Carolina alone more than \$2,000,000 annually is paid out for standing timber, does not this great industry seem worth perpetuating?" Mr. W. W. Ashe, of the Forest Service, in a paper on "The Future Use of Pine Land," insisted that even in eastern North Carolina, where a large part of the land would eventually be used for agriculture, "the owners of land now in mature timber must see that the timber is cut with due regard to the future earning value of the property; the owner with young growth must defer the cutting of that until it has

reached its maximum rate of value increment and so cut as to secure that increment; the holder of cut-over lands must see that they are properly stocked and that there is no waste or nonproductive area."

Mr. C. I. Millard, president of the John L. Roper Lumber Company of Norfolk, among other things brought out strongly the need for State experimental and demonstration forests, and offered to give the necessary land for such an area in the Loblolly Pine region. This offer was accepted by the State geologist on behalf of the Geological Board, which has recently been empowered by the Legislature to receive gifts of land for this purpose.

Addresses by Mr. R. E. Parker, secretary of the Audubon Society of North Carolina, on "Game and Shore Birds as a State Asset," and by Professor John J. Blair, superintendent of the City Schools of Wilmington, on "Arbor Day in Our Public Schools," were the features of the afternoon session. An illustrated lecture at night, on "Forest Conservation," by Dr. Joseph Hyde Pratt, State geologist, brought the regular sessions to a close.

Mr. C. C. Smoot, III, of North Wilkesboro, was elected president, and Mr. J. S. Holmes, of Chapel Hill, was reelected secretary-treasurer. A special committee, composed of Mr. Guy A. Cardwell, Dr. Joseph Hyde Pratt and Mr. R. R. Cotten, was appointed to draft resolutions regarding the death of Dr. J. A. Holmes. In reporting, this committee referred to the splendid work Dr. Holmes had accomplished in starting forest conservation work in North Carolina, endorsed the Joseph Austin Holmes "Safety First" Association and pledged the aid of the Forestry Association to the endowment of that memorial.

Resolutions were also adopted urging the continuance of the annual appropriation of \$2,000,000 for the purchase of land under the Weeks Law, demanding that the Federal appropriation for co-operating with States in fire prevention be made permanent and asking Congress to aid in the suppression of the white pine blister rust.

FOREST STUDENTS' PLANS

FOR ten weeks during the coming summer, a party of students and their instructors from the Department of Forestry at Cornell will be in camp on a forested tract at the south end of Saratoga Lake. This summer course in practical forestry in the woods forms a regular part of the work in the third, or summer, term at the State College of Agriculture, and the transfer of faculty and students from Ithaca to a forest area is made for the purpose of getting first-hand information in the woods themselves. The instructors feel that practical woods work can be satisfactorily taught only in the forest. The summer term is of the same length and character of work as the spring and fall terms, and the same schedules of lectures and examinations are required. It differs from the other courses only in the fact that the woods take the place of the classrooms. Courses will include forest measurements, forest utilization, the study of tree growth, and forest management.



THIS MAY BE SEEN BY MANY TOURISTS

Few caves of any size in the cliffs of this country were overlooked by these seekers after impregnable homes. The one here shown is about 6½ miles east of the Roosevelt Dam, and is admirably located for view. The ruins of Arizona are more accessible to rail and sleeping accommodations, being practically on the main line of the Southern Pacific and reached by auto from Globe or Phoenix. At the Dam is a comfortable lodge, only 6½ miles from the ruins.

Mesa Verde and Casa Grande National Parks

BY MARK DANIELS

Former Superintendent of National Parks

ICAME like Water, and like Wind I go."

Pregnant with mystery and romance, wrapped in serene and lofty silence, at the top of the continent lies the great green mesa that was once the abode of a race that has long since been forgotten. To the north, the east, the west, the south on lower plains, the soil is plowed, the fields are tilled, and upon the breeze is borne the hum of man's endeavor. But no sound rises to the level of those silent cities and crumbling walls, that hold the traveler in the spell of their aged mysteries. Whence came these men who hewed the stones and timbers of their buildings with crudely fashioned implements, yet placed them with such skill that they have withstood the centuries? Where are the children of those other children who in the morning of time thronged the Great Mesa and scaled the cliffs in such numbers that the paths worn by their naked feet are still deep in the attesting stone?

"I came like Water, and like Wind I go."

Tucked away in huge caverns near the tops of great, precipitous cliffs and overlooking the desert below and

beyond, with its ever-changing lines, these wonderful ruins stand as monuments to at least one philosophy of Omar Khayyam, for we know not whence they came nor why, nor why they went nor where. There are their towers and outposts, their grain rooms and secret chambers, their work rooms and living rooms, but amongst all the things unearthed there, nothing has told the secret of their race. What tragic truths are locked forever within those silent cliffs! The life of a nation! The death of a race! Efforts have been made to read their story from the evidences left and much has been learned, but not enough to make the history complete. Nor are the mystery and the search for its solution the only fascinations that draw the tourist to this land, for the skies are ever sparkling clear, the air is balmy and of a purity that annihilates distance. To one standing at the edge of the cliffs that bound the southern extremities of the mesa, the mountains of New Mexico that lie beyond the desert, seem distant but a stone's throw. Stretching between the cliffs and these distant mountains

lies the great desert striped with crimson, purple and tan broken here and there with great up-thrust rocks, towering monuments of the desert gods. On every side are canyons with ruins here and there and the traveler may wander for days from one to another, fascinated, thrilled and lost in endless conjecture.

The Park is reached by the Denver and Rio Grande Railroad, which delivers its passengers at Mancos in the southern part of Colorado whence a trip of 20 odd

The top of the mesa is covered with stunted cedars and pines, and its elevation changes gradually from 8,200 feet at the northern boundary of the Park to 6,800 feet at the southern boundary. This elevation gives the cool, crisp climate that is one of the greatest charms of the Park. In addition to the cliff dwellings that are to be found in the caves along the canyon walls, the top of the mesa is dotted with remains of mound-builder dwellings.



CLIFF DWELLINGS NEAR ROOSEVELT DAM, ARIZONA, OVER GLOBE-PHOENIX AUTO ROAD

A tour of the Apache Trail takes the tourist past this unusual ruin, where the walls were surfaced with a plaster of adobe. Perhaps this was the first step toward the modern hard-wall finish for interiors, and it is doubtful whether our modern plastering would stand the same test of time, although the dry atmosphere of Arizona favors the antique.

miles will take the tourist to the ruins. The town of Mancos lies in a small valley, from the rim of which this great smooth mesa slopes at a slight grade to the southwest, cut in the direction of its slope by a series of deep canyons which, by erosion, have been extended like fingers into the high plateau. These canyons vary in depth from 500 to 1,000 feet, their walls being in most places practically vertical. The formation of the country is sandstone, and as a result there are broken ledges which have formed great piles of talus, so that at the present time it is possible, by means of carefully picking one's way, to climb down one side and up the other of these canyons in many places.

The ascent on to the mesa is made from Mancos, which is at an elevation of approximately 7,000 feet, by automobile along a road which climbs the face of steep bluffs to the edge of the cliffs on the northern boundary of the Park. From here, to the north, is a view of the great Montezuma Valley, one of the most fertile of the many valleys in the State of Colorado. There are few places in this country where the observer is so impressed with the panorama that stretches before him. The one and only road that traverses the Park follows the edge of the northern cliffs to the Chapin Mesa, passing by an old dried well of this lost race to the lower portion of

the Park, and then stops in the vicinity of one of the finest ruins, "Spruce Tree House."

This ruin is located in a short spur of Spruce Canyon, and is at an elevation of about 6,900 feet above sea-level. From the brink of the canyon one sees stretched out before him the great desert of Arizona and New Mexico, quivering in the heat of the southern sun. In the distance may be seen the hazy peaks of the mountains of New Mexico which form the southern boundaries of the great desert expanse. From the top of the mesa the ingenious trail that leads to the entrance of the cave passes down through small crevices and over projecting ledges to the ruins.

The first thing that strikes the visitor is the unusual circular chambers that appear like pits in the floor of the ruin. These chambers are called "Kivas," and are presumed to have fulfilled the function of ceremonial rooms. In Spruce Tree House there are approximately eight of these rooms, which were used by an estimated population of 400 persons. Back of these are the chambers which were occupied by the inhabitants of this ancient village. The cave

with smaller stones. The hewn stones were shaped with the aid of implements made of a harder stone and in many instances the trueness with which they were laid suggests the presence of a plumb line and the absence of labor unions. In some ruins may be found the whetstone, as it were, a large boulder of sandstone, the deep grooves in



Photograph by Mark Daniels.

THE ENTRANCE TO THE KIVA

This is by ladder through a square hole in the roof. The top, or roof, performs the function of surface for the open terrace. The roof of this cave is strongly blackened by smoke that rose from fires of centuries ago, but the walls are clean and well preserved.

which testify to this primitive method of sharpening an axe. It must have been a joy to the youths of the day that there were no creaking grindstones to turn for father.

Spruce Tree House was discovered and named in 1888 by two brothers who ranged cattle in the neighborhood, but this fact does not excuse the government and the committee on naming things (or whatever it is that is responsible for the names of our national parks and other places) from continuing the use of the word "house" to describe a group of houses large enough to accommodate 400 persons or more. How would we like to feel that posterity, in the event that the fate of some of our great cities should be that of Tyre or Sodom, might fasten upon it the ignoble title of River House or Painted



Photograph by Mark Daniels.

CLIFF PALACE, THE LARGEST KNOWN GROUP OF RUINS

The round, vat-like chambers in the sunlight are kivas, or ceremonial rooms, in which war councils were held. The round tower shown is the only one completely circular to be found in the Mesa Verde ruins. The square tower just beyond was once four stories in height, a proud skyscraper of this ancient race.

is 216 feet in length and 89 feet in depth at its widest point. There are 114 rooms in the village, some of which were at one time three stories high. It has been shown that at least fourteen of these rooms were uninhabited, and were used as mortuary chambers or for storage. I said that the first thing which struck the visitor was the circular chambers, but perhaps it is the wonderful degree of preservation shown by these walls. Whether theirs was a representative form of government or not it is certain that the pork barrel principle of construction was unknown to them, for some of their stone walls have stood for nearly a thousand years without the aid of an annual appropriation for maintenance. The walls and partitions are laid up in hewn stone, set in adobe mortar and occasionally chinked



Photograph by Mark Daniels.

A CHANCE FOR THE ROMANTIC

The balcony and the parapet wall of Balcony House are the most interesting features of this ruin. Whether the balcony was used by dusky lovers of a starlight night or put only to the prosaic use of a means of communication will probably never be known. Until it is, however, the romantic are privileged to attribute to it the former use.

House? These names are most misleading and give the stranger the impression that the ruins are but the remains of an occasional dwelling rather than those of a village of 400 souls.

The largest group of ruins in the Park, and perhaps the largest known to have been built by this strange race of people, is the one so unhappily yclept "Cliff Palace."



Photograph by Mark Daniels.

SPRUCE TREE HOUSE

This is located near the upper end of a spur of Spruce Canyon. It was given the name because of the large spruce tree in the foreground. The park ranger station and tourist headquarters are directly across the canyon on the opposite rim. From there this and other fine views of the ruins may be had.

Here again the responsibility of a misnomer should bring the pangs of regret to the committee on names. It lies in an eastern spur of Cliff Canyon and is an enormous cavern with roof arching nearly a hundred feet above a floor which is several hundred feet above the bottom of the canyon. From the terraces of the ruins one may look toward the west across the canyon and see on the top of a great promontory the fallen stones which once formed a pueblo. There is an example in Cliff Palace of a four-storied structure which was, in all likelihood, used for living quarters. It is the furthest square tower shown in the photograph and lays claim as the predecessor of the modern tenement. Whether the choicer rooms were considered those on the upper floors or not cannot be said, but in light of the fact

that the smoke from the numerous family fires found its only outlet by flowing along the surface of the roof, it is more than probable that the upper floors fell into the class of our present "fifth floor back."

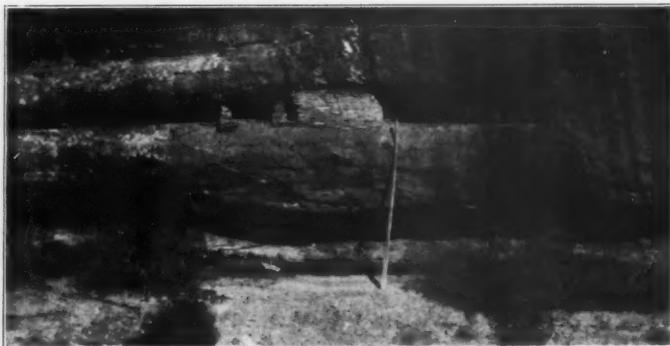
There are three distinct terraces which are readily recognizable by the different levels of the Kivas. These Kivas were the ceremonial rooms used by the different clans of warriors, or at least, such is the contention of those who have studied the subject. It is presumed that in a city of the size of Cliff Palace, which probably accommodated in the neighborhood of one thousand people, there were a number of clans, the warriors of which preferred to meet in the war chamber of their own particular clan. It is certain that if anything but the most amicable relations existed between the members of the various classes not many of them could have been housed in one Kiva without the certainty of a fight. These Kivas are of peculiar construction and always built along the same lines. They are circular in form and contain a fireplace with a stone slab for baffle board, which deflected the smoke and regulated the draught. Some Kivas have a small hole in the floor, presumed to have been



Photograph by Mark Daniels.

BALCONY HOUSE

This is the only example of the use of balcony construction found among the ruins of the Cliff Dwellers. From the parapet wall there is a sheer drop of several hundred feet to the floor of the canyon below. Even at the present time the village is accessible from one end only, and that by virtue of the crumbled walls.



Photograph by Mark Daniels.

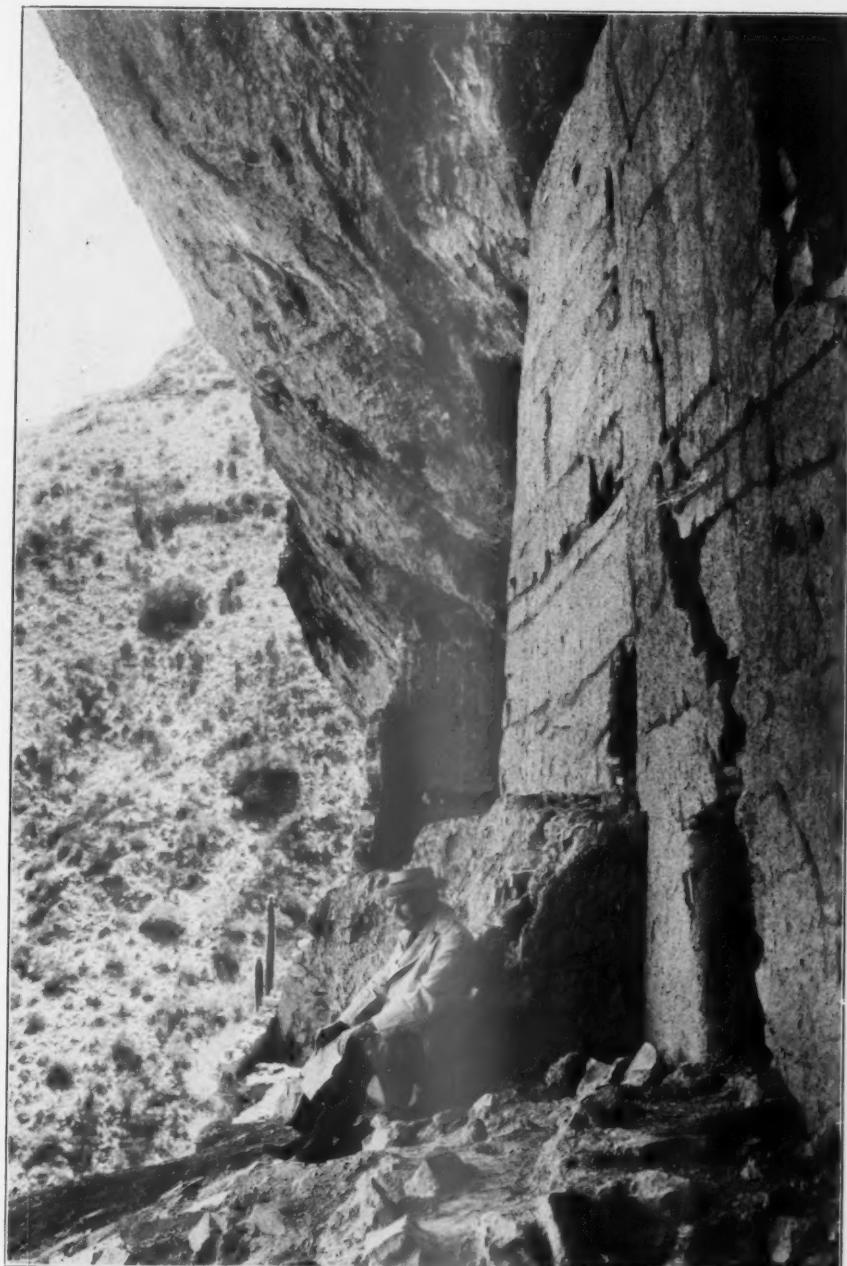
A SUBURBAN COTTAGE

No doubt when the village became filled some were forced to take up their abode elsewhere, and so preempted these small crevices near the main cave. The means of access was the pole, on which enough of the branches had been allowed to remain to give a foothold for the clambering owner.

used in religious rites for a communication with the underworld. The roofs of the Kivas were covered with cedar beams and adobe floor above and formed part of the area way of the terrace. In most Kivas access was secured through a hole in the top. While the Kivas are of interest in all of the ruins, to my way of thinking, the most fascinating bit of structure in Cliff Palace is the Speaker Chief's Tower, as it has been named by someone with imagination. It is at the northern end of the village and overlooks the entire arrangement from a quite commanding position. On the second floor level is a landing which may have been used by the chief of the tribe to address the warriors of his city. The outer face of the Tower proper is circular in form, above which are a series of loopholes,

probably designed for the protection of the mighty chief. The Tower itself, together with the various chambers connected to it, really more closely approximates the idea of architecture than any structure that may be found in the ruins of the Mesa Verde.

Located in about the center of the village is the only example of a circular tower that can be found in any of the villages. This rises in the rear to the roof and perhaps at one time was higher in front than shown. It is ringed about midway with a row of loopholes and is of unusually good masonry and thoroughly well built. Whether this tower was used for purposes of defense, observation, or as spacious drawing rooms for the ladies of the court has never been definitely settled, for in those perilous times the element of defense entered into every walk of life. That there were several walks of life in the days of the Cliff Dwellers is evidenced by the fact that they manufactured cotton cloth, fiber sandals, feather cloth and many articles of attire. The feather cloth which these people used is particularly attractive and of a quality that would undoubtedly lead a woman of today through a bargain-counter rush, were it manufactured and on sale at the present time. The body of this cloth is a coarsely woven cotton woof in which the downy portions of feathers are woven so that a shawl made of this material presents nothing but a surface similar to eiderdown. Samples of it were found enshrouding mummies unearthed in some of the sealed chambers. There are a great number of other ruins which, while not so large as Cliff Palace and Spruce Tree House, are in some respects more fascinating. In Navajo Canyon, of which Spruce Canyon is a branch, are the Watch Tower, Thomas House and Peabody House. In Cliff Canyon are Painted House, Willow House, Community House and the Swallows' Nest. In Soda Canyon there is the Balcony House, the only example of cliff dwelling architecture that shows the use of a balcony. Here one's imagination can picture children of cliff dwellers dangling their brown toes over



A SMALL RUIN IN A GOOD STATE OF PRESERVATION

This is in the vicinity of the Roosevelt Dam. The overhanging ledge of the cliff admirably protects the walls of the ruin from the weather, but not from the depredations of the tourists. The view from the windows and doors bespeak an eye for the beautiful on the part of the builders.

the parapet walls and hurling stones upon wild beasts below, happy in the security of their impregnable homes.

There are other examples of the ruins of the Cliff Dwellers scattered along a general line drawn in a south-westerly direction from the Mesa Verde. The Government has seen fit to establish a park around another group of these ruins which are located at Casa Grande. The entire district in the vicinity of Casa Grande, Globe and the Roosevelt Dam is dotted here and there with ruins of the Cliff Dwellers. Those at Casa Grande are not so fine or so interesting as the ruins near the Roosevelt

Dam. The ruins of this district are reached from the Southern Pacific at Casa Grande Station, which is about twelve or fifteen miles from the Reservation, but the most interesting and complete trip is along the Phoenix to Globe auto road which traverses the old Apache trail. This trip is particularly attractive, as it is only a link en route, for the tourist traveling west can go to Globe on the Southern Pacific & Arizona Eastern Railroad and travel from there to Phoenix, Arizona, by automobile, covering the Apache Trail, the Roosevelt Dam, the Cliff Dwellings, and view the famous Superstition Mountains.

There are two groups of Cliff Dwellings near the Dam, one of which is about four and a half miles from the Dam. Farther up on the mountainside is a more extensive group, the walls and structures of which are in a remarkable condition of preservation. The ruins of Casa Grande are mostly of the form of foundations showing the locations where the walls were once placed, while those of the Roosevelt Dam country are better preserved.

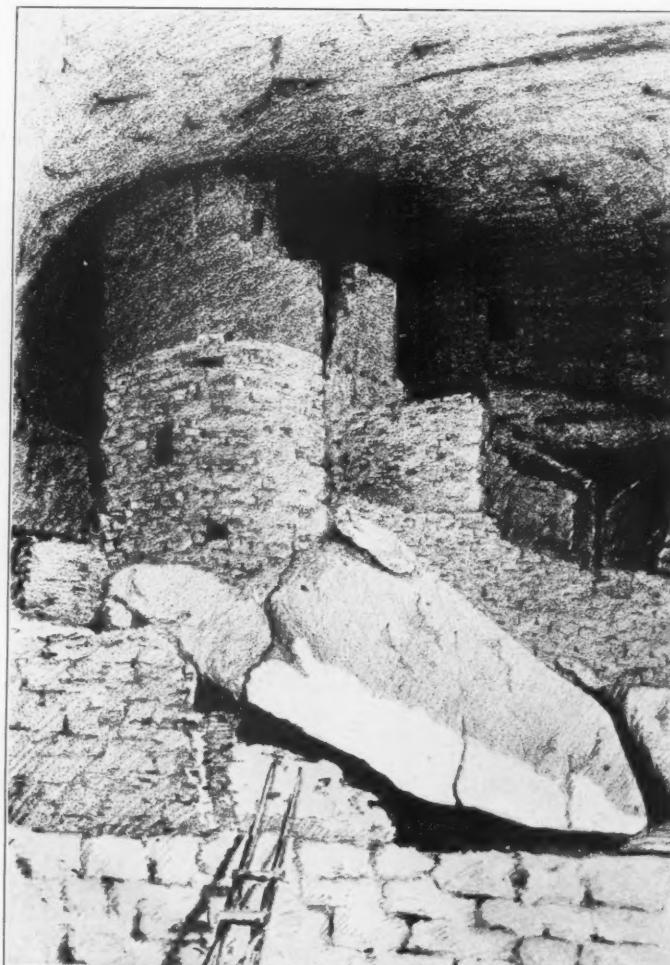
As a mecca for the American tourist whose avenues of escape to the land of the upturned palm have been closed the country of the Cliff Dwellers extends unprecedented attractions. Primarily, the climate of the Great Mesa is, in so far as my knowledge extends, the most attractive and invigorating that can be found. The skies are cloudless from May until November. The atmosphere is as dry as can be imagined. The temperature is such that one is comfortable with or without a coat, and the scenery in general is of an exotic character that fascinates beyond description. Couple with this the wonderful experience of climbing in and out through the ruined structures of an ancient people and the possibility of discovering some small article that may prove to be a missing link which has escaped the trained eye of scientists, and you have a tourist's paradise.

Why our Federal Government has neglected to secure better facilities or to even adequately preserve the relics of these ruins has been a question frequently discussed.

Baron Nordenskjold, the great Swedish anthropologist, visited Mesa Verde in the later eighties or early nineties and took therefrom not only the impressions for which

he came, but also most of the loose implements, bits of pottery, feather cloth and other evidences of that form of civilization which obtained amongst the Cliff Dwellers. What little he left has since been scattered amongst the residents of the district so that by the time the National Park was created, there was little left for the tourist to study. If a museum consisting of small structures containing a few glass cases which might cost, perhaps, so much as \$2,000, could be squeezed from an annual billion-dollar budget, the residents of the district who have collected these curios would willingly lend them for exhibition, but to date the plea of this wonderful Park for some means of preserving its relics has gone unheeded.

Why the district has not received more attention on the part of tourists and the lovers of antiquity has been a mystery that is only second to the mystery of the ruins. Thousands of people annually



Lithograph pencil sketch by Mark Daniels.

THE SPEAKER CHIEF'S TOWER

From the second floor terrace the chief is presumed to have addressed his people from time to time. The terrace is about 15 feet square, and commands a view of the entire village. The lower portion is semicircular on one side. The upper is rectangular and provided with loopholes, at which guards were stationed, no doubt, to protect their chief from any little interruption by stones or arrows projected by a disrespectful auditor. The pencil seemed to be the only instrument that would show the details in these deep shadows.

spend their money in pursuit of the lure of antiquity. Most of them are not familiar with the fact that the oldest living thing on earth and the oldest ruins in the world are on this continent. Time, in its backward stretch, seems to reach the limit of human appreciation along about the time the pyramids were built in Egypt, yet if those who travel, looking for the relics of antiquity, but knew this wonderful country, I feel certain that more of their time would be spent at home.

Much has been written of the romance of the desert, and as a result tourists visit Egypt and the barren wastes of Northern Africa with their eyes blinded to the fact that



Photograph by Mark Daniels.

A TYPICAL HOUSE

The strong sunlight and intense shadows at this altitude introduce difficulties in photography. It was not an easy matter, therefore, to secure a picture of these cedar rafters and the queerly shaped doorways. The ledges at either side of the doors are at the height of the hand, and were used as a rest to help lift the body over the door sill. The round, black object is a clay vessel of unusual lightness, blackened by fire.

similar fascinations exist at their very door, enhanced by the absence of an intolerable climate. I would not appear to speak disparagingly of the glory of the desert's fascinations, nor of life along the Nile and the thrills



Photograph by Mark Daniels.

A TOWER OF SPRUCE TREE HOUSE

If this were the entire ruin in the cave, the name of "house" might be justified. There are, however, over a hundred rooms in this ruined village which throws the name of Spruce Tree House into the class of misnomers. The tower here shown bears on its side one of the rare examples of primitive efforts toward mural decoration. The light "T" on the wall in shadow is painted.

that come to him who travels in the Holy Land. These are all part of the world traveler's field, and are a blessing to those who may enjoy them. I resent the fact, however, that those places in the old country have occupied a position in the public eye that has excluded the vision of similar wonders in their own country.

TREES CURE THEIR OWN WOUNDS

WHEN a bullet or any foreign body penetrates a tree not sufficiently to kill it, the wound cicatrizes almost in exactly the same way as a wound on the human body heals. If it did not, destructive microbes would enter and cause decay of the tissues.

"Trees," writes Henri Coupin in *Nature*, "are very well equipped for healing their wounds, and, more fortunate than we, an antiseptic dressing is almost auto-

matically applied. As soon as the lesion has taken place the vegetable reacts to the wounded spot. Its breathing at this point is quickened, and at the time protein matters are rushed to the scene.

"Many plants are provided with secreting canals filled with more or less gummy substances, which are instantly poured out over the wounded surface and protect it. This is true especially of the conifers—pines, firs, etc.—of which the resin makes a swift and impermeable antiseptic dressing."

In trees that have little or no resin the wounded part turns brown. This is due to the appearance of a juice that seems to be a mixture of gums and tannin. And the cells of the tree start into activity, proliferating and filling up the cavity with new cells. If the wound be large, these take the form of vegetable cicatricial tissue, which makes a plug and remains as a scar. In the event that the wound be confined to one of the limbs of the tree, it not infrequently happens that the limb becomes dead and drops off, the wound healing and leaving the tree nowise the worse for the loss of the absent member.

FORESTRY ASSOCIATION OFFICERS

AT the recent annual meeting of the Northern Montana Forestry Association the following officers were elected:

President—C. A. Weil, Eureka, Montana.

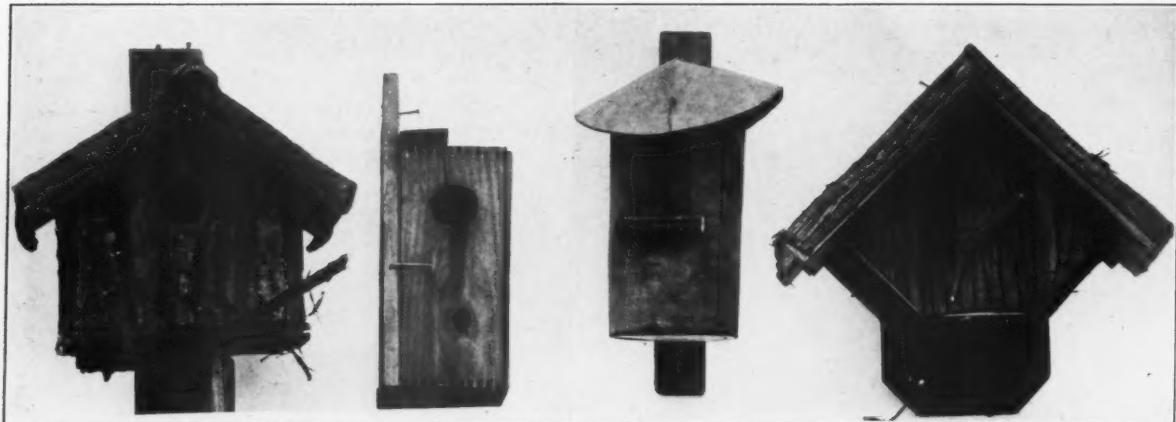
Vice-President—W. R. Ballord, Somers, Montana.

Secretary and Chief Fire Warden—A. E. Boorman, Kalispell, Montana.

Board of Directors—C. A. Weil, Eureka; W. N. Noffsinger, Kalispell; C. B. Roberts, Fortine; W. R. Ballord, Somers; A. E. Boorman, Kalispell; M. Driscoll, Kalispell; C. D. Conrad, Kalispell; John R. Toole, Bonner; John C. Van Hook, Helena, and C. B. March, Kalispell.

PUBLIC USE OF NATIONAL FORESTS

HERE were 18,342 special-use permits in force on the National Forests on June 30 last, according to figures just compiled by the United States Forest Service, to show the varied uses to which the public is putting the Government land involved. The list includes 59 apiaries, 2 brickyards, 31 canneries, 39 cemeteries, 9 churches, 1 cranberry marsh, 32 fish hatcheries, 1 golf link, 48 hotels, 1 astronomical observatory, 10 fox and rabbit ranches, 1,085 residences, 74 resorts and clubhouses, 3 sanitariums, 500 sawmills, 163 schools, 9 slaughter houses, 57 stores, 16 municipal watersheds, and 182 water-power sites, with many other uses. Fees collected on 7,895 of these permits contributed a total of \$175,840.40 to the general Forest revenues, but 10,447 of the permits were issued without charge.



HOME-MADE BOXES

These two wren boxes are correctly built. One is adorned with bark, the other is made from a chalk box. The diameter of the openings is $1\frac{1}{8}$ inches.

COMMERCIAL BIRD HOUSES

One of these is made of roofing paper by the Winthrop Packard Co. of Canton, Mass., and one from rustic cedar by A. P. Crescent, of Tom's River, N. J.

The Bird Department

BY A. A. ALLEN, PH.D.

Assistant Professor of Ornithology, Cornell University

HOW TO ATTRACT THE SUMMER BIRDS—BIRD HOUSES

THOSE who have been feeding the birds during the winter and have enjoyed the friendliness of chickadees, nuthatches, and woodpeckers at their windows; those who welcome the return of the birds in the spring and know the mellow call of the bluebird and the bubbling song of the wren; and those who enjoy the knowledge that their property is being guarded against the attacks of insect pests, will all be interested in trying to tempt these little wayfarers to the vicinity of their homes.

The making of bird houses is an old, old story, but like many other classic tales, it will bear retelling. The original idea was simple enough, but of recent years it has been encumbered by so many suggestions that people hesitate to undertake what really is an easy task. For the more simple the box the more natural will it appear and the more attractive will it be to the birds.

There are over 50 species of birds in the United States and Canada which utilize holes in trees for nesting, including many of the most useful. The borer-destroying woodpeckers, the larvae-destroying nuthatches, the egg-destroying chickadees, the mosquito-destroying tree swallows—all build in holes in trees and may be attracted to nesting boxes. But in these days of scientific forestry when every dead tree is condemned, and every dead branch lopped off by the "tree-doctor," their natural nesting sites are rapidly disappearing and their numbers are correspondingly decreasing. It is the wise timber owner, therefore, who puts at least one nesting box in the place

of every dead tree which he removes. The chickadees and woodpeckers which are with us in winter and the wrens and bluebirds that return in the spring will move on unless they find plenty of nesting sites.

Of the fifty or more hole-nesting birds, a comparatively small proportion have learned yet to accept the artificial nesting site, only nine species taking them regularly and nineteen more utilizing them occasionally. It is to be expected, however, that eventually all the species will learn to adapt themselves and perhaps even others will so modify their present nesting habits as to accept artificial structures. This has proved to be the case in the celebrated experiments of Baron Von Berlepsch where out of a thousand nesting boxes placed on his estate, birds have gradually been induced to occupy over 900.

The species which regularly use nesting boxes are as follows:

House wren (and all its sub-species), bluebird (eastern and western varieties), chickadee (northern and southern sub-species), purple martin, tree swallow, flicker, violet-green swallow (western), house finch (western), Bewick's wren, English sparrow and starling.

The species which occasionally use nesting boxes are as follows:

White-breasted and red-breasted nuthatches, downy woodpecker, hairy woodpecker, red-headed woodpecker, tufted titmouse, Carolina wren, crested flycatcher, screech owl, saw-whet owl, barn owl, sparrow hawk, wood duck, song sparrow (rarely), and dipper (western).

The species reported as having used covered shelves, opened at the sides, are robin, phoebe, and barn swallow.

HOW TO MAKE THE BIRD HOUSE

To begin with, the word "house" is a misnomer, for the less houselike the bird box, the more practical will it prove. The fanciful doll houses with several compartments, chimneys, frescoes and verandas, while occasionally used by English sparrows or martins, are usually very ineffective, and, of course, entirely out of place. The more it is like the old hollow limb in the orchard or the hole in the fence post, the more pleasing to the eye of the bird will it be.

The best materials to select in building bird houses are weathered boards, rustic cedar, or slabs of wood with the bark adhering. Smoothly planed boards should be avoided. Gourds, when obtainable, can be made very acceptable by cutting a hole of the proper size in one side, cleaning them out and drilling a small hole in the bottom to drain off any rain that may beat in. Tin cans may be used, but should be painted or covered with bark to make them less unsightly. One end should be replaced by a block of wood and the opening of the proper size should be made toward one edge of this or in one side of the can. Green bark of chestnut or other trees can sometimes be secured and nailed into the form of a hollow cylinder. A hollow limb, a deserted woodpecker's



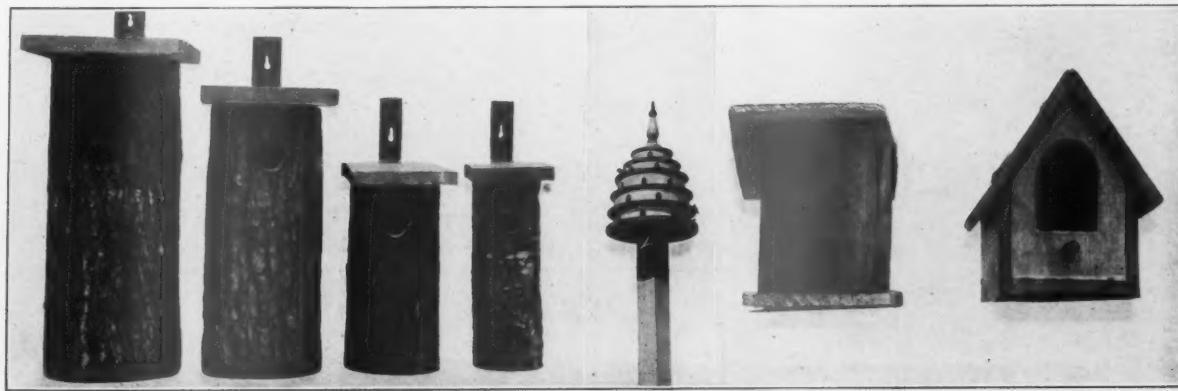
CHICKADEE AT ITS NEST

The home of this little fellow is in a hole in a stub. The chickadees will use nesting boxes, when they are properly built, and it is a wise tree-owner who puts up at least one nesting box for every tree he cuts down. Now that dead trees and branches are cut, the birds have no easy time finding natural homes in dead or dying trees.

it somewhat larger even up bird boxes for the first time would do well to make them of average size so that they will be acceptable to the greatest variety of birds. In this way the chances of attracting them are increased. Such a box would measure $5 \times 5 \times 12$ inches with the long axis vertical. If special effort is to be made to attract flickers, streech owls or sparrow hawks, boxes $6\frac{1}{2} \times 6\frac{1}{2} \times 24$ inches should be made. If martins are desired a house of 10 to 30 compartments should be constructed with each compartment 6 to 8 inches square. Rows of gourds tied to cross pieces and raised on poles will likewise attract martins and are extensively used in the South. If one wishes to build a large martin house, explicit directions can be obtained from Farmers' Bulletin No. 609, of the U. S. Department

nest, or a block of wood hollowed out in the form of a woodpecker's nest are all good devices, but usually it is easier to cut rough boards into the proper lengths and nail them together securely in the form of a small box. Sometimes boxes of the proper size, such as chalk or starch boxes, can be found ready made and require only some reinforcement.

The exact size of the box is not very important except that it should not be so large as to waste lumber, nor yet so small as to give insufficient room for the nest. A box should never be smaller than $3\frac{1}{2} \times 3\frac{1}{2} \times 6$ inches, inside measurements, and it would be better to make for wrens. One putting



BIRD HOUSES OF LOGS

These are manufactured by the Audubon Bird House Company, of Meriden, N. H., by hollowing out sections of logs. The largest size is for flickers and screech owls, the smallest for wrens, the intermediates for chickadees, nuthatches, bluebirds, tree swallows, and downy woodpeckers.

A MARTIN HOUSE

This is occupied by many pairs of these swallows. Each compartment is from five to eight inches square and the openings about $2\frac{1}{2}$ inches in diameter. Martin houses are the only ones which should be built with more than one compartment with the openings near the floor.

INCORRECTLY BUILT

These bird houses are not properly constructed. In one the opening is at the bottom instead of two inches from the top; in the other the opening is much too large.

of Agriculture, entitled "Bird Houses and How to Build Them." All other birds' houses should be built with only one compartment.

The size and position of the opening are much more important than the exact size of the box. A round hole is the best, and, except in martin houses, should be cut above the middle line on one side and preferably about two inches from the top. All hole-nesting birds, except the martin, wish to be out of sight from the entrance while incubating.

If there are not many sparrows or starlings about, it will be better to make the openings in all the boxes, except those for the largest birds, $1\frac{1}{2}$ inches in diameter. This will admit birds up to the size of the bluebird and tree swallow, and is not large enough to be objectionable to the wrens and chickadees. If sparrows are numerous, however, one can keep them out of the boxes and still admit the smaller species by making the opening $1\frac{1}{4}$ inches in diameter.

A table of the proper diameters for the openings of bird houses (for the different species of birds) as given by Mr. H. K. Job is as follows (where two figures are given they represent the maximum and minimum sizes which are correct):

- a. $1\frac{1}{8}$ inches: house wren, Bewick's wren, Carolina wren, chickadee.
- b. $1\frac{1}{4}$ inches: white-breasted nuthatch, tufted titmouse.
- c. $1\frac{1}{2}$ to $1\frac{5}{8}$ inches: bluebird, downy woodpecker, crested flycatcher, tree swallow, violet-green swallow.
- d. $1\frac{3}{4}$ to 2 inches: red-headed woodpecker, hairy woodpecker.
- e. $2\frac{1}{2}$ inches: flicker, saw-whet owl, purple martin.
- f. 3 inches: screech owl, sparrow hawk.
- g. $4\frac{1}{2}$ inches: barn owl, wood duck.

NESTING MATERIAL

No nesting material in the form of straws, feathers or sticks should be placed in the box. This would discourage rather than encourage prospective tenants, for they always rent unfurnished. In flicker and other woodpecker boxes there should be placed in the bottom a couple of inches of ground cork or coarse sawdust



A HOME FOR THREE SUCCESSIVE YEARS

Wrens have returned to this box for three years, and are expected to do so for many more. The last young wren of the new family is seen leaving the nesting box.

ing cavities of any of these birds, he will find that with few exceptions they are in the open places in bright sunlight or light shade, and never among the thick branches of a tree or in dense shade. The best place, therefore, is on a pole 8 to 12 feet from the ground in an open space or at the edge of trees facing the open. A post on the porch or the unshaded side of the house will also serve if the box is made to face out. House wrens and nuthatches are the exceptions that will sometimes use boxes placed in dense shade. The trunk of a large tree, a telegraph pole or a high fence post are other places which will prove satisfactory, although perhaps not quite so much so as the separate post. An excellent place for the large flicker or sparrow hawk box is the top of the stub of a tree whose upper branches have died and been cut away.

CARE OF THE BOX

If a box is well made and once in position, it need never be moved. Frail or fancy boxes should be taken in each fall and replaced in March. Cleaning a box is not necessary under ordinary circumstances, as the birds will do their own renovation, but it is well to have the top or one side hinged, so that one can get at the inside if necessary, to throw out the nests of sparrows or squirrels or caterpillars, or to clean out the box in case anything happens to the old birds so that the young die. Aside from this there is little need of care and at the

because the woodpeckers build no nests and must have something to keep the eggs from rolling about. A layer of sawdust will do no harm in any other box, but is not necessary.

PLACING THE BOX

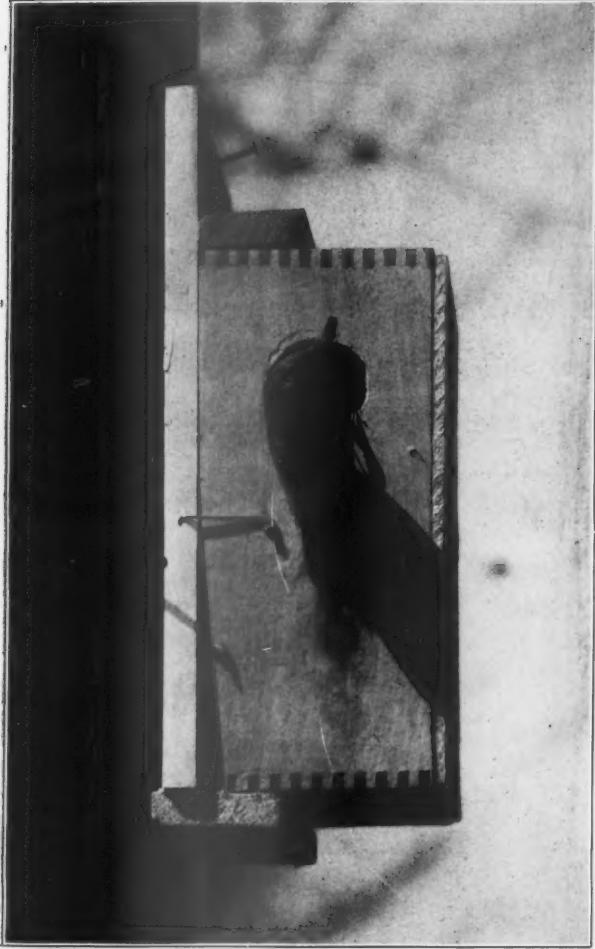
Quite as important as the size and position of the opening is the selection of the place to put the box. It is possible to put up ten or fifteen boxes and have nothing but house sparrows nesting in them, when, if properly placed, they would be occupied by several pairs of wrens, swallows or bluebirds. If several boxes are put up, they should be at least 25 feet apart and preferably farther. These native birds are not socially inclined toward other hole-nesting species, and drive away all others from the immediate vicinity of their established domain. If one examines the natural nest-

end of the season the old nest can be thrown out or left in, it making little difference to the birds when they return the following spring. The lice which often infest the nests of wrens are harmless and die soon after the young leave.

BIRD HOUSES AND FORESTRY

Mention was made above of the estate of Baron Von Berlepsch, where over 90 per cent of a thousand boxes have been occupied by birds. He has experimented, like-

protecting the forests by attracting and increasing bird life that the German government adopted his method, and now there are in every forest numbers of bird houses and food shelters. Many species that did not at first use the boxes have learned to do so and each year the offspring hatched in the boxes are continuing and strengthening the newly formed habit. In this country similar experiments are being started and many estates now boast of hundreds of nesting boxes inhabited each year by an increasing number of these indispensable guardians of the forests.



A WREN TAKING FOOD TO ITS YOUNG

This box measures 4 x 5 x 7½ inches, and is about the right size for wrens or chickadees. Great care should be taken to see that it is properly placed. The boxes should be at least twenty-five feet apart, as native birds are not socially inclined toward other hole-nesting species, and drive away others who trespass upon their preserves.

wise, in planting the shrubbery most attractive to birds for nesting sites (such as hawthorns and berry bushes) and has pruned young trees so as to increase the number of available sites. In this way and by keeping down the numbers of bird enemies and by feeding the birds in winter he has been able so to increase the numbers of birds nesting on his estate that when all the adjacent country was swept by a plague of insects, his estate was the one green spot on the landscape. So convincing was the demonstration of what was possible in the way of

BIRD LIFE IN MARCH

March is the month of awakening. The snows melt, patches of green appear and spring is in the air. Not the spring that speaks of summer at hand, but hours of promise and days of disenchantment. But the long siege of winter is over and man and the animals feel the impulse to move. It is now that that mysterious instinct to migrate begins its powerful sway in the realm of birds, that instinct which impels many species to travel thousands of miles and gives no rest until the journey is accomplished.

Some species have not retired far south and when the instinct is aroused, it drives them close behind the receding snows. The horned larks came back in February, the robins and bluebirds follow the first warm days of March, and soon will come the blackbirds and grackles. The geese go honking northward when they know the wheat fields are bared and the lakes once more open, and following in their wake are the phoebe, meadowlark and killdeer. Before the month has run its course the Northern States will echo with the rattling call of the kingfisher and the sweet notes of the mourning dove and white-throated sparrow, while the Southland will begin to welcome the more adventurous of the travelers returning from the tropics, redstarts, yellow warblers and the black and white creeper being among the first to come.

The early birds are less regular than the warblers and orioles of May, whose arrival we can predict quite accurately. The weather is less settled and storms will delay them. But March is a month of promise and the hardier the adventurers, the more we welcome them.

SAMPLE COPIES OF AMERICAN FORESTRY

MEMBERS of the American Forestry Association having friends interested in trees, woodlands and forests are urged to send their names to the association, and a sample copy of the magazine, AMERICAN FORESTRY, will be sent to them with the compliments of the member.

Have you invited a friend to become a subscribing member?

Kraft Paper and its Uses

BY W. R. BROWN

THE many new and useful articles which are being manufactured out of paper, and more particularly out of Kraft paper, are of interest on account of their unusual character, and because they represent reduction in the cost of living and a close utilization of forest product, with its attendant beneficial effect on forestry. As is usual in matters of close utilization, foreign countries have been the pioneers in the use of wood fiber, and many of the products which are the subjects of illustration are of Scandinavian manufacture. Their manufacture in this country will no doubt only be a matter of a short time, and open a wide field for profit.

The process of manufacturing sulphate pulp, from which Kraft paper is made, originated some twenty years ago in Sweden, and for some ten years was carried on in Sweden, Norway and Finland before being introduced into this country. The first mill for manufacturing sulphate pulp on this side of the Atlantic was established by the Brompton Pulp and Paper Company, at East Angus, Quebec, and they still continue one of the large producers, being exceeded only by the Wyagamac Pulp and Paper Company, at Three Rivers, Quebec, and the Brown Corporation, at La Tuque, Quebec.

Briefly, the process is what is known as the soda ash process to distinguish it from the sulphite process, the main points of difference being that the principal chemical used in the sulphate process is sodium sulphate, commonly called salt cake, which is mixed with chloride of lime to form caustic soda, and this, when reduced by heat, forms sodium sulphide carbonate, commonly known as black ash.

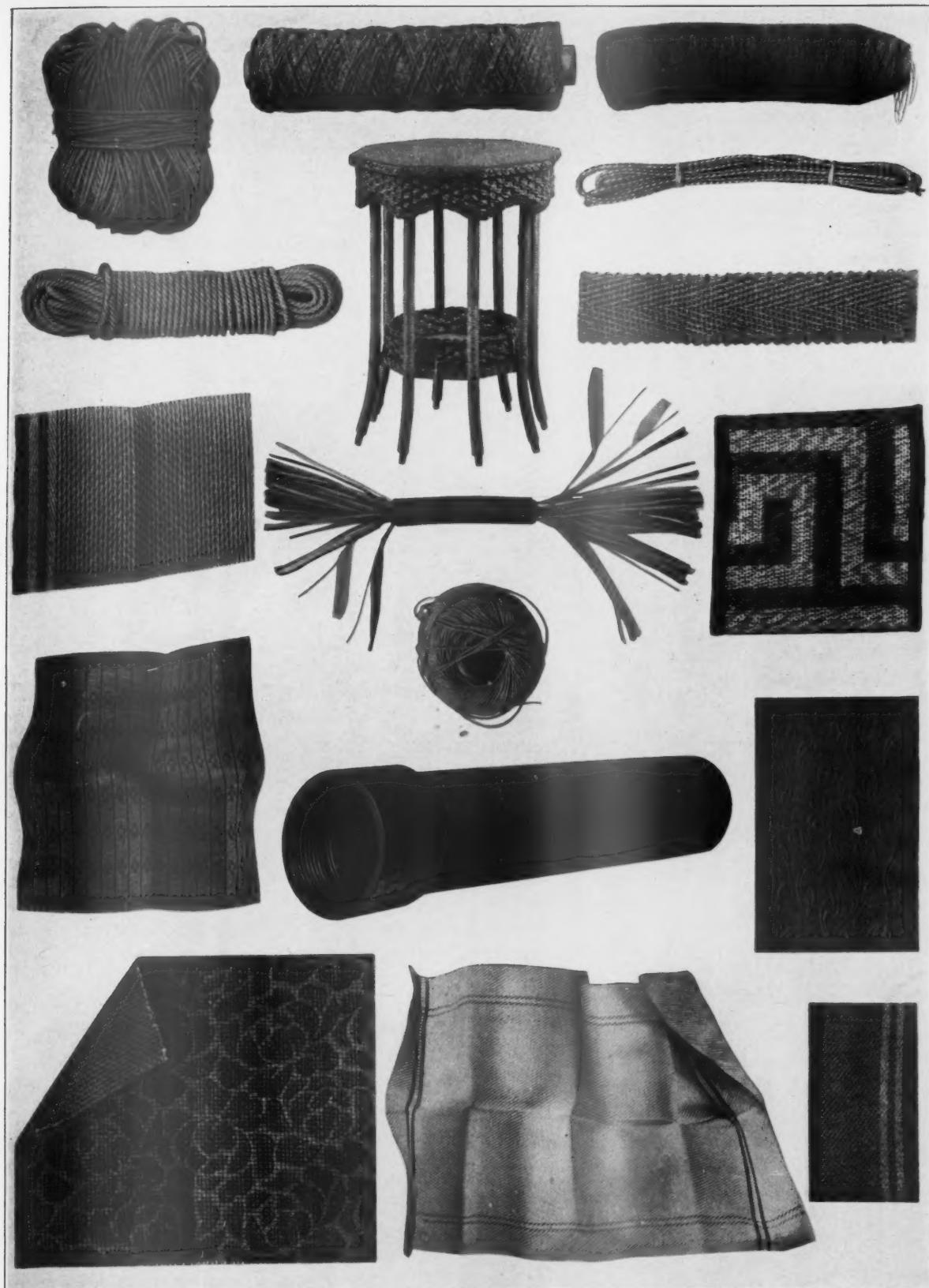
Sulphate pulp is sold to paper manufacturers throughout Canada and the United States, and there are thirty or more mills using this pulp which produce a little over a thousand tons of Kraft paper daily.

The distinguishing characteristic of Kraft is its extreme strength and resistance to wear by folding, due to the gentle action of the chemicals, which disintegrate the cellulose from the lignin and preserve the long fiber of the wood. It is of the brown color which is so often seen in wrappings for parcels or magazines. The tensile strength of this paper in comparison with other manilla wrappers of equal weight and thickness is from one-quarter to one-half greater. On account of the marked superiority of Kraft, many imitations have been put upon the market, but a return to the use of the original has almost always followed. While the price of Kraft is somewhat higher for wrappers per pound, the customer secures nearly half again additional area and a much stronger and more serviceable paper.

Large quantities of Kraft paper are used in the department stores, and particularly by the large mail-order

houses in the West who ship by parcel post. It is particularly suitable for envelopes, especially such as are manufactured for heavy documents and money, in place of leather-board containers. Strips of Kraft paper are used in binding the corners of cardboard boxes, particularly shoe boxes. Strips of gummed Kraft paper are used in the same manner as twine about boxes and packages, and are much stronger and do not slip off. Even coal is now being delivered in bags made of Kraft in place of canvas bags which had to be emptied and returned, the paper bags being merely burned up with the coal. With a light backing of cloth fiber and a filler against dampness, Kraft paper, called "Watershed," is used for covering automobile tires for shipment in place of burlap. "Watershed" paper is also used for the oversea shipment of dry goods and groceries. Kraft cardboard is used in the manufacture of dress suit cases. Embossed Kraft paper is used for wallpaper, book covers, and for covering fancy boxes. Very good imitation leather is made from Kraft. Stripped into narrow rolls one-eighth of an inch wide, it is run through a machine which gums one side. The gummed side is spread with a fine lint of cotton or linen. These strips are then run in a spinning machine and twisted into threads, from which the cotton and linen fibers protrude as a thin fuzz. This thread is afterward woven into various fabrics, as imitation burlap for wallpaper, cloth for upholstering furniture, grain bags, tailors' lining for suits, imitation cotton and linen towels, webbing, straps for surcings, bedding, etc. By the introduction of colored thread and stamping in colors, pleasing designs are worked into the fabrics. Small twine made of twisted Kraft paper is used for tying up bundles; is woven into coarse mattings, and furnishes the warp for cheap rugs and carpets. Twisted into many strands, it is woven into all sizes of rope, particularly laundry and window rope and binder twine for harvesting machines. To add strength, it is sometimes spun on a hemp core. One piece of rope of Kraft paper has a breaking strength of 28 pounds and runs 383 feet to the pound; another has a breaking strength of 24 pounds and runs 750 feet to the pound; a third has a hemp center, a breaking strength of 43 pounds and runs 642 feet to the pound. Kraft paper is also now being used as insulation in the wrapping of overhead and underground copper cables.

By a new patented process, the Berlin Mills Company is now producing paper pipe wound over cores of various diameters and made in various thicknesses, which is thoroughly permeated with a tar compound, forming a strong, compact pipe capable of taking a thread and lighter and less expensive and more durable than iron pipe. This is used for various purposes, such as under-



SOME OF THE ARTICLES MADE FROM KRAFT PAPER

Heavy Kraft twine; Kraft yarn; fancy Kraft rope, spun on hemp core; flag, laundry, window and cable rope of Kraft; rattan filling of Kraft shellacked for table; Kraft webbing for various purposes; overhead and underground high-power copper wire cable insulated with Kraft paper; coarse mattings of Kraft; Kraft upholstery fabric; Kraft pipe, with thread joint; plain and colored Kraft twines; embossed Kraft; printed Kraft burlap; fine Kraft mattings, printed, interwoven and leather bound; medium mattings of Kraft; Kraft toweling.

ground conduits for electric wires and for resisting the action of various corrosive acids, especially in coal mines.

Kraft paper could be easily adapted to the same use discovered by a Japanese during the Russian war, who invented a soft, tough and waterproof paper which was used as a pellicular peignoir. They also made it into paper sheets which could be folded into a small package and which would keep out dampness. There are other uses for this paper, such as for napkins, handkerchiefs, paper plates, cups, pails and other articles too numerous to mention, but the most surprising use it has been put to is that one-eighth-inch strips, shellacked and twisted, are used in manufacturing articles of furniture in the place of or in conjunction with rattan, such as chairs, tables and baby carriages. So it would appear that there was a profit in changing wood into pulp, making the pulp into paper, and turning the paper back again into wood.

T. C. LUTHER CUTS LARGEST ELM

ON one of his lumber jobs in the town of Putnam, Washington County, New York, and within sight of the historic Fort Ticonderoga, T. C. Luther, of Saratoga Lake, has had cut and drawn to his sawmill, located on the shore of Lake Champlain, an elm tree that will make 5,600 board feet of lumber.

The trunk of the tree measures 68 feet to the limbs, is 60 inches in diameter at the butt and 27 inches at the top, which, by Scribner's log rule, will cut 5,100 feet, and some of the limbs, which are as large as good-sized trees, will cut 500 feet more, making a total of 5,600 feet.

There was so little taper to the tree that the first two 12-foot logs will cut 1,334 feet each. A rare thing in a tree of this size is that it is perfectly sound and without a check or blemish on the surface the entire length of the trunk.

The rings of the tree indicate it is 720 years old, which shows it started long before the discovery of America.

On account of its enormous size, the ordinary sawmills that are in common use nowadays cannot manufacture it into lumber, and Mr. Luther is now making special arrangements for manufacturing this and some other extremely large logs he has in stock.

Foresters and lumbermen who have seen this tree in the mill yard pronounce it the finest and largest specimen of the elm they have ever seen.

PRIZES FOR FORESTRY ESSAYS

THE Kentucky State Board of Forestry is offering prizes for essays by the children of the public schools on forestry. The special subject set for this year is, "A Plan for Beautifying the Grounds of the School by Planting Trees and Shrubs." Prizes of \$12.50 and \$7.50 are offered for high school students and similar prizes are offered for the grade pupils. The grading is to be based on English, 40 per cent; selection of species of trees and shrubs, 30 per cent, and maps and sketches, 30 per cent.

WHAT MAKES "BIRD'S-EYE" MAPLE?

AMERICAN FORESTRY was recently asked, "What makes bird's-eye maple?" And more than one reader will be interested in knowing. Though the figures of few woods are better known, the cause of the bird's-eye has been the subject of interminable guessing and theorizing. It has been accounted for in more ways than nearly any other phenomenon of the forest. The favorite theory has been that sapsuckers, by pecking holes through the bark of young maples, make scars which produce the bird's-eye figure in the wood during succeeding years. Bird-pecked hickory is often cited as an analogous case, yet who ever saw bird's-eye figure in hickory, though the bark may have been perforated like a collender by the bills of energetic sapsuckers? The effect in the case of hickory is the opposite of bird's-eye in maple; the wood is discolored and unsightly.

Some account for the bird's-eye figure by attributing it to the action of frost, but the connection between cause and effect has never been shown to exist, even by the most ardent advocates of the theory.

The explanation of the phenomenon is simple, and a person with a good magnifying glass can work it out for himself. The bird's-eye figure is produced by adventitious buds. These have their origin under the bark of the trunk. The first buds of that kind may develop when the tree is quite small. They are rarely able to force their way through the bark and become branches, but they may live many years just under the bark, growing in length as the trunk increases in size, but seldom appearing on the outside of the bark. If one such bud dies, another will likely rise near it and continue the irritation which produces the fantastic growth known as bird's-eye. It is said that the Japanese produce artificial bird's-eye growth in certain trees by inserting buds beneath the bark. The Field Museum, Chicago, has a sample of what is claimed to be artificially produced bird's-eye wood from Japan.

CANKER WORMS AFTER ELM TREES

CANKER worms, which within the past few years have killed thousands of elm trees in Kansas, are again active, according to S. J. Hunter, professor of entomology in the University of Kansas.

The best treatment to halt the ravages of the little pest, Professor Hunter says, is to bind the trees with a layer of cotton to fill the crevices in the bark, and outside of this wrap a layer of stout tar paper, tying it firmly. Cover the paper with some sticky substance that will stop the spiderlike creatures in their upward course.

The insects will have finished their upward course on the trees by the first week in February, Professor Hunter says, but unless the trees are looked after immediately they will be all over the branches in a few days.

The National Forests

BY HON. D. F. HOUSTON,
Secretary of Agriculture

NEARLY 25 years have passed since the first public timber reservation was made and 10 since the National Forests were put under the Department of Agriculture. Sufficient time has elapsed to determine whether their creation was wise.

The principal purpose in establishing the Forests was to secure sound economic and industrial development.

Experience had shown that private ownership of large areas of timberland in most instances involved a sacrifice of public interests. Many private investments in forest lands are made for the mature timber and not for the purpose of growing new tree crops. The long time required to raise a merchantable product, the risk of loss from fire and other destructive agencies, the fear of burdensome taxes, and the uncertainty of market conditions usually make the holding of cut-over lands unattractive to capital. Hence, the peculiarly public character of the problem of forestry.

Before the National Forests were created practically

no effort was made to protect the timber on public lands from destruction by fire, notwithstanding the fact that the situation was peculiarly hazardous. During the last decade a fire protective system has been developed. Extensive improvements have been made, including more than 25,000 miles of roads, trails, and fire lines, 20,000 miles of telephone lines, many lookout stations, and headquarters for the protective force. In the year 1914, when conditions were exceptionally unfavorable, nearly 7,000 fires were fought successfully. They threatened bodies of timber valued at nearly \$100,000,000, but the actual damage was less than \$500,000. This work not only is saving public property; it is conserving the material for local economic development and for permanent industry. Furthermore, the results of the Federal system have induced many States to take up the work, and active cooperation between the two agencies has followed.

The service rendered by the National Forests is not confined to protection from fire. The resources are being



NATIONAL FOREST NURSERY IN CALIFORNIA

Mount Shasta in the background. Forest renewal is generally obtained through natural reproduction, but planting stock for artificial reforestation work is grown in various nurseries, with a total capacity of 10,000,000 seedlings yearly.



AGRICULTURAL VALLEY BOTTOM IN THE MOUNTAINS

It is the Department's policy to make available for settlement all lands which are chiefly valuable for farming. Those not chiefly valuable for agriculture are retained in public ownership.

utilized to build up the country. They furnish the timber required by settlers, communities, and industries within and near their borders. More than half of the timber now cut annually is used in the vicinity of the Forests. This includes all that taken free and under sales at cost, and approximately 45 per cent of the commercial cut. Hundreds of mining districts throughout the West, from small projects requiring an occasional wagonload of props or lagging to the great copper district of central Montana, which consumes about 380,000 pieces of mining timber annually, are supplied. Railroads also are furnished a large part of the ties and other material required for their lines in the Rocky Mountain regions. A million and a half ties now are cut from the Forests yearly. Throughout the West tim-

ber is taken from them for nearby towns, irrigation projects, hydroelectric power plants, and the like, while thousands of individual settlers obtain it for fuel and farm improvements. On the Alaskan coast the salmon packers, towns, and settlers use 40,000,000 feet a year from the Chugach and Tongass Forests.

The National Forests also meet the demands of the general lumber market. More than 300,000,000 feet are cut annually for the nation-wide trade. Since 1908 there have been taken from them 5,000,000,000 board feet of wood and timber products.

Not only is timber amply supplied and future resources safeguarded, but the ultimate damage to the West through impairment of its water resources, vitally important for irrigation and other purposes, also is pre-

vented. The damage would have been of a kind to force at a huge cost the undertaking of protective works against erosion, torrent formation, and floods. Other countries have been compelled to do this. At the time the National Forest policy was entered upon the agencies making for destruction were actively at work. A range overgrazed and forest fires which burned unchecked were diminishing the water-storage value of the mountains and accelerating soil destruction and removal. The evils averted and the benefits secured through only a decade of protection and regulated use constitute a gain of great moment.



RANGER COUNTING AND MARKING RAILROAD TIES ON A NATIONAL FOREST TIMBER SALE

Such sales supply railroads in the Rocky Mountain region with a large part of the ties and other material required for their lines.

Although the National Forests were established primarily to conserve the timber and to protect the water-sheds, it has been the consistent aim of the department to develop all other resources.

Grazing, mining, agriculture, water power, and recreation—all are fostered. One of the most important of these is grazing. The greater part of the summer range in the Western States is in the Forests. Under the regulated system the forage is utilized fully, without injury to the tree growth and with adequate safeguards against watershed damage. There were grazed last year under pay permits 1,724,000 cattle and horses and 7,300,000 sheep and goats. Several hundred thousand head of milch and work animals were grazed free of charge, and more than 3,500,000 head of stock crossed the Forests, feeding en route, also free of charge. Not including settlers who have the free privilege or persons who have only crossing permits,

greater than it was 10 years ago. Since 1905 the number of persons holding grazing privileges has increased nearly 200 per cent. This is due in part to the enlarged



MOUNTAINEERING MADE EASY

Climbing Pike's Peak by auto. The National Forests are open to the whole nation for health and recreation. They embrace the high, rugged mountains of the West, the scenery of which is unsurpassed.



FOREST OFFICER TALLYING SHEEP AS THEY ENTER A NATIONAL FOREST

It is probable that a hundred million pounds of beef and mutton are sold each year from herds and flocks occupying the forest ranges. Grazing is regulated with a view both to range conservation and to community growth and diffused prosperity. In other words, public control serves social as well as economic ends.

there are 31,000 individuals who have regular permits. During the year ended June 30, 1905, there were only 692,000 cattle and horses and 1,514,000 sheep and goats on 85,627,472 acres. The number of animals now sustained in proportion to the area of the Forests is 50 per cent

area of the Forests, but can be attributed principally to wider use by settlers and small stockmen. When the regulated system was established the Forest ranges, like the open public lands today, rapidly were being impaired. The productivity of the land for forage in most places has been restored and everywhere is increasing; the industry has been made more stable; stock comes from the Forests in better condition; range wars have stopped; ranch property has increased in value; and a larger area has been made available through range improvements. It is probable that 100,000,000 pounds of beef and mutton are sold each year from herds and flocks occupying the ranges. That the Forests have promoted the development of the stock industry is indicated. This is appreciated by stockmen and they are urging that a similar system of range regulation be extended to the unreserved public lands. But it is not merely the stock industry that has been benefited. The grazing privilege has been so distributed as to promote healthy community growth, increase settlement, prevent monopoly,

and diffuse prosperity. In other words, public control has served social as well as economic ends.

The National Forests contain approximately one-half of the water power of the West. The department for nearly a decade has been issuing permits for its development. Unfortunately, the present law does not authorize the granting of permits for fixed periods. It should be amended, and recommendations to this end have been made repeatedly by the department. While authority to grant term permits undoubtedly would aid water-power utilization, the fact remains that development, practically to the extent of the market, actually is now taking place

over 1,000,000 more are under permit for future construction. The chief obstacle to further immediate water-power expansion is the lack of market, for plants in operation in the West now have a surplus of power of which they cannot dispose.

The National Forests are open to prospecting and the initiation of mineral locations just as in the open public domain.

The existence of the Forests gives certain advantages to the miner. It is not on the great private timber tracts in the western mountains that the miner is prospecting. It is only on the Forests and other public lands open to mineral locations, if he makes a discovery that he can get title merely through conscientious compliance with the mining law. Many miners today are securing their timber from the Forests, and because of its protection and continued production a steady supply at reasonable rates is assured.

The National Forests are used also for health and recreation. They embrace the high, rugged mountains of the West, the scenery of which is unsurpassed. These great areas are open to the whole nation. Already more than one and one-half million people visit them annually for recreation, and this number is increasing rapidly as roads and trails are built, making new points accessible. The lands bordering on the hundreds of lakes and streams in the Forests offer attractive sites for camps and for permanent summer residences. Authority now exists to grant term leases for the erection of summer homes, hotels, and

similar buildings, and large numbers will take advantage of this privilege. Public ownership has protected the natural beauty of these areas. Their recreational value has been maintained and increased through road and trail construction and through intelligent study of the needs of the public.

To the agricultural interests of the West the proper handling of the Forests is of great importance. The Forests conserve and increase the supply of water. Fire protection gives property an added value, as do roads, trails, and other Government improvements. In fact, the existence of the Forests gives a permanence to agriculture that does not exist where the timberlands are privately owned.

What has happened in the older lumber regions of the country is well known. The scattered agricultural areas were occupied as long as the timber lasted and lumbering



DEVELOPING COMMUNICATION ON A NATIONAL FOREST

Rangers constructing a bridge. Public ownership carries with it responsibilities to aid in community upbuilding through road work in undeveloped regions.

on the Forests. In the Western States power development has advanced proportionately very much more rapidly than in the East, where land is privately owned. The amount of water-power used in the generation of electricity by public utilities corporations, street railway companies and municipalities has in the last decade increased 440 per cent in the West, or more than twice as fast as in the remainder of the country. There, in proportion to population, four and one-half times as much water power is used as in the remainder of the United States, and nearly three times as much as in the Eastern States.

Of the existing 1,800,000 water horsepower in the Western States, 50 per cent is in plants constructed in whole or in part on the Forests and operated under permit from the department. Plants under construction will develop about 200,000 additional horsepower, while

operations furnished markets, kept up roads, and gave employment when the farm could be left. But with the exhaustion of the timber, the devastation of the lands by fire, the abandonment of the logging roads, and the moving of the industry to some new region, the farms, too, were abandoned and whole townships depopulated.

It is the department's policy to make available for



FELLING A GIANT WESTERN YELLOW PINE

Since 1908 there have been taken from the National Forests five billion board feet of wood and timber products. All this timber has been cut in accordance with forestry principles. Young growth has been safeguarded and a new crop provided for.

settlement all lands which are chiefly valuable for farming. In order to open such areas a careful classification is being made. Large tracts found to be valuable for agriculture or unsuited for permanent Forest purposes are eliminated. During the last five years about 14,000,-000 acres have been released. In addition, individual tracts are classified and opened to entry upon application of home seekers. Since the work was begun more than 1,900,000 acres have been made available for the benefit of 18,000 settlers.

In short, lands within the Forests really adapted to agriculture are being occupied as homesteads under favorable conditions. While the lands suited to settlement are classified and opened to entry, those which are not chiefly valuable for agriculture are retained in public

ownership. The alienation of timberlands under conditions that will lead not to settlement but to speculation and to increasing the holdings of private timber owners would defeat the very purposes for which the Forests were established.

The real agricultural problem within and near the Forests is to make possible the successful occupancy and development of the lands that already have been opened to entry or actually patented. The mere private ownership of land does not insure successful use of it. In Oregon and Washington alone there are about 3,000,000 acres of logged-off land, much of it agricultural in character, now lying idle. In this condition speculative holding of the land for higher prices plays a large part. Another cause is the lack of transportation facilities. A settler may clear land and raise crops upon it, but he is helpless if he cannot market them. There are great areas of fertile land unused today on this account. In many sections near the National Forests pioneer conditions still exist. The population is small and the task of road building is beyond the means of the residents. There is little or no demand for timber and the receipts from the Forests which go to the community are small. The fact that the public property is not subject to taxation makes such communities feel, and very justly, that the Forests are not contributing enough to local development. This situation should be changed. Assistance should be given in the building of roads to bring into productive use the resources of such regions.

Two of the 155 National Forests are in Alaska. The Tongass comprises approximately 15,000,000 acres in southeastern Alaska, while the Chugach, covering the timbered area about Prince William Sound and thence westward to Cook Inlet, contains about 5,500,000 acres. The volume of timber on the two Forests is estimated to be between sixty and eighty billion board feet, about one-eighth of the total estimated quantity on all the Forests. In accordance with the general principle of organization adopted for all the Forests, but to a greater degree than elsewhere because of their remoteness, the administration of the Alaska Forests is decentralized to permit the prompt transaction of business and ready response to the needs of the public. Approximately 40,000,-000 feet of timber are cut annually under sales. Settlers secure free, without permits, the timber needed for personal use. Mining locations are made as on the public domain. Agricultural land is classified and placed at the disposal of settlers. Every encouragement is given to the use of lands for miscellaneous purposes. In some places there is an increasing use of land for canneries, stores, and other enterprises.

FAMOUS ELM TREE CUT DOWN

THE big elm tree in Independence Square, Philadelphia, said to have been planted by King Edward VII of England, when he visited this country as the Prince of Wales in 1861, was cut down a short time ago. The tree had been dead for some time.

Children's Department

Devoted to imparting information about trees, woods and forests to boys and girls so that they may grow to know how necessary trees are to the health, wealth and future of their country.

BY BRISTOW ADAMS

MAKING MAPLE SUGAR

MARCH is the month for maple sugar, so the maple tree is a good one for us to think about at this time.

Maples are to be found all around the world, except in the tropics and in the very far north. In the United States their range is from the extreme north to the extreme south, and hard maple, or sugar maple, forms a large part of our Northern hardwood forest. Florida maple, at the southern extreme, belongs to the soft maple

good deal of white pine and hemlock. In the fall the evergreens appear very dark, almost black, in the midst of their more brightly colored neighbors. The birch is always a flaming yellow, the beech leaves are somewhat coppery, but the maple has all hues, from red to yellow, and adds the more striking color notes to the autumn landscape.

The maple, if any, is the child's tree, both because of the lovely colors which tempt the little ones to carry



BORING HOLE IN SUGAR MAPLE

Into this hole a "spile," either of metal or wood, is driven. Tapping a tree does not hurt it unless a large number of spiles are used in each tree.

type, and its bright leaves are a delight among the darker long-leaf pines with which it grows. About this time of the year, when the sap is beginning to flow with its Northern cousins, its new coral-pink leaves can be seen a long way through the darker pine woods, where they shine almost like a pillar of fire. Later on the leaves turn to green, but even this green is lighter and brighter than all of the surrounding trees, and in the fall the leaves turn back toward the red shades, and in most cases are a brilliant scarlet.

All over its range the maple is noted for the bright color of its foliage. In the North woods it grows with beech and birch, among which there is likely to be a



A GROUP OF TAPPED MAPLES

These grow in a pasture convenient to the farmhouse, and yield a goodly supply of sap every spring. The sap runs out through the tapped hole in the tree just as water would run out of a barrel and drips into the buckets.

sprays of the leaves to teacher in spring and fall, and because it is the source of maple sugar and maple syrup. And what child, where the soft maples grow, has not "squirted" the green seeds from the winged "keys," or has not sprayed the sweetish, refreshing juice into his or her mouth?

It is said that the Indians in New England knew how to tap the maple trees and get the sweet sap long before the whites came; but trees had been tapped for sugar by people in the Old World long before America was discovered, so it is hard to tell who gets the praise for starting the American maple sugar industry.

While Vermont is generally thought of as the maple

sugar State, a good deal comes from New Hampshire, New York, Pennsylvania, Ohio, Michigan, Wisconsin, and northern Indiana.



GATHERING SAP IN WOODEN BARRELS

The barrels are chained to a sled, which is shod with wood and so easily pulled over the rough ground and through a grove of maples.

One of the great delights of a child's farm life in these States is when they begin work in the "sugar bush." In fact, a large part of the year has pleasures connected with it. In the first place, there is the work of getting the supplies ready in the fall, and of getting and storing the wood for boiling down the sap. In some places, particularly in the Adirondack Mountains in New York, making maple sugar has become a regular business, with special machinery and large buildings almost like factories, instead of the small sugar sheds of the farm woodlot.

There are many puzzling questions about the flow of sap in trees, and even the scientists do not fully understand it. We have seen how the tree itself is a factory, and how the leaves make and store up more starch than is needed for its growth during the summer, as a reserve supply in the cells of the sapwood or outer layers of the tree,

for early growth and development during the next spring. These outer layers are more full of sap in the early spring than at any other time. After the bright-colored leaves have dropped from the tree in the autumn,



BOILING SAP INTO SYRUP

This is the primitive, old-fashioned method of boiling the sap in open pans. It is, perhaps, the one most familiar to children and the one in which they most delight; for it is more fun to be at the open fire than to see the sap boiling in the modern sugar house.

the roots still go on bringing in water, and the amount of water in the tree keeps growing larger and larger through the months of December, January, February and March until at the end of this time these outer tissues are nearly half water.

Just why this water flows so actively in the spring is not fully known, but it is supposed that it may be due largely to the fact that the water expands with heat, or that the cells become active and exert an actual pressure. Every year around the sugar-boiling fires in the woods the old men who have been tapping trees year after year have discussions as to whether the sap flows up or down, and nobody seems able to decide it. This is perhaps just as well, because there are not too many such good subjects in the world to talk about. Probably the truth of the matter is that the sap comes out of the "spile" from all directions, because water, under pressure, has



TWO THIRSTY SUGAR MAKERS

Where is the child, living where sugar maples grow, who has not, when the trees are tapped, had many a sip of the sweetish, refreshing sap which flows into the buckets?

no choice as to where it will flow, and will go out of any available opening, and sap is mainly water. The sap runs out through the tapped hole in the tree, just as the water would run out of a barrel full of water if a hole were made in the barrel. In other words, there is such a strong pressure inside the tree that a release of that pressure will cause the sap to run toward the hole both above and below.

Tapping a tree does not hurt it unless a great many spiles are used in one tree. The loss of sap from one or two holes is not enough to make any difference. There is a chance that disease may enter the tree through the top-hole, but this is not likely to be the case if the tree is vigorous. Toward the end of the sugar season the sap is not as good as at first. This is because the sap gatherers are not particular to keep their buckets thoroughly clean. A sort of slime will form on the inside of the buckets, and this will give the sap a bad flavor. It is also true that during the latter part of the season, especially when the buds begin to swell, the sap is slightly different from that at first, because food materials other than sugar are being carried in it to supply the needs of the growing tree. The sugar makers know this as "buddy" sap.

Children in parts of the country where the sugar maples do not grow can well envy their more fortunate friends in the Northern States. It is great fun to go out with the men and boys and teams into the woods, tap the trees and hang up the buckets. Then, when the buckets are full, the sap is collected and taken on sleds to the sugar house to be boiled down into syrup or sugar. Farther south people have tried to get sugar from the silver maple or soft maple, and it will yield a little. This fact is borne out in the Latin, or scientific name of the tree, the real sugar maple, *saccharum*, being so named in Latin, while the Latin name of the soft maple, translated into English, means the maple of little sugar.

TREES FOR REFORESTING

TEN THOUSAND acres of waste private land in New York State can be reforested this year if advantage is taken of the Conservation Commission's offer to distribute, at cost of production, 10,000,000 forest tree seedlings and transplants now in the five State nurseries. The prices range from \$1.50 per thousand for two-year seedlings to \$4.50 per thousand for four-year transplants, according to an announcement just made by the Commission.

One thousand trees will reforest an acre at a total maximum cost of trees and labor of not over \$10, according to the Commission. In forty-four years the value of the stand will be \$370 per acre, if of white pine, and but little less than this if of spruce. This is 292 per cent more than the maximum investment of \$10 would amount to at compound interest for the same period, and 1,016 per cent more than it would come to at simple interest.

A PROTEST

M R. C. C. ANTHONY, of Wayne, Pennsylvania, in writing to the *Philadelphia Ledger*, says: "Haverford College has a namesake in far-off California. Not an infant college, but a giant redwood tree, one of the most spectacular in Yosemite Park, according to a guide-book to the park, which is among the new books in the Library. It shows a photograph of the tree beside a similar sequoia, yclept the 'Ohio,' with the following comment: 'The "Haverford," named for the college in Pennsylvania, illustrates the Indian practice of using big trees as back-logs for fires.'

"This refers, I think, to one of those numerous signs tacked at random upon the big trees in the Mariposa Grove—placed there with as little rhyme or reason as a vandal's initials on a monument, to name the tree after various institutions, people, cities and States—from Peoria even unto New Jersey. If Haverford College has any sense of the fitness of things, it will request the proper authority to have the sign removed forthwith.

"If, in places of great interest, there is anything more asinine than those impudent and offensive signs, the distressed tourist will have to go a long way to find it."

REFORESTATION WORK

THE Semet-Solvay Company, of Syracuse, which owns and operates large mines in West Virginia, under the direction of the Solvay Collieries Company, has recently become very much interested in reforestation on its holdings in West Virginia. It feels that its lands, to be of real value in the future, even though the coal and other minerals have been removed, should be reforested. It is planning, therefore, to begin reforestation either the coming spring or in the spring of 1917. The Solvay Company has asked the New York State College of Forestry at Syracuse to examine and report upon reforestation upon their holdings at Kingston and Marytown, in central West Virginia. Professor J. Fred Baker, of the college, is now in West Virginia examining these holdings, and is accompanied by a party of eight senior students, who will take part in the field examination of the properties. After the field studies are completed, the party of boys will visit several large lumbering operations in West Virginia. Mr. H. J. Kaestner, State Forester of West Virginia, met the party at Kingston to cooperate in any fire protection arrangements which may be suggested.

JANUARY, 1915, COPIES NEEDED

THE American Forestry Association will be glad to buy copies of *AMERICAN FORESTRY* for January, 1915, and members having copies of that month and not needing them will confer a favor on the Association by mailing them to the office at Washington, D. C.

Ornamental and Shade Trees

A Department for the Advice and Instruction of Members of the American Forestry Association.

EDITED BY J. J. LEVISON, B. A., M. F.

FUNGUS DISEASES OF TREES

BY R. B. MAXWELL

City Forester, Baltimore, Maryland

THE fungus diseases of trees are produced by the action of plants. These plants differ from those seen about us, in that they contain no chlorophyll, or the green coloring matter which is common with the "green" or higher plants, and they derive their nutriment directly from the trees rather than from the soil. A fungus disease which derives its food from a living plant is a parasite, while one deriving its sustenance from a dead plant is called a saprophyte. Since arboriculture deals only with living trees, arborists are not interested in saprophytes. Parasitic fungi, as a rule, gain entrance to a tree through wounds caused from abrasion, shock, or improper pruning. After having become established, the fungus begins to develop small rootlets, called mycelium, which are pushed out into the tree tissues as a means of anchoring the disease plant and of obtaining food. As a result of the action of certain little-understood stimuli upon the mycelium, a substance is secreted which results in decay or the breaking down of the tree tissues. This, then, is the process which has resulted in unsightly cavities, diseased areas, and frequently discolored or distorted foliage.

In considering this question, let us study it in a broad and general manner, from the viewpoint of those charged with the care of trees. We shall attempt to identify the diseases from the form and character of their fruiting bodies and from the nature of attack, endeavoring to apply curative measures, or to so conduct our cultural operations as to prevent the occurrence of such troubles.

For the sake of convenience, let us divide the tree diseases into three rough groups:

1. Fungus diseases attacking the leaves of trees.
2. Fungus diseases attacking the stem and branches of trees.
 - (a) The rusts.
 - (b) Those with inconspicuous or hidden fruiting bodies.
 - (c) Those with conspicuous fruiting bodies.
3. Fungus diseases attacking the roots of trees.

FUNGUS DISEASES ATTACKING THE LEAVES OF TREES

These diseases are for the most part not dangerous, but are worthy of consideration, since their action is frequently responsible for the marred beauty of our fine specimen trees. The troubles are known as "leaf spots," and belong to the general class of fungi known as molds

and slime molds. The following trees are frequently attacked by the leaf-spot troubles: American chestnut, Norway and red maples, American and European lindens, black walnut, American sycamore, black oaks, catalpa, horse-chestnut, aspens, wild cherry, and magnolia. Of the above leaf spots that of the sycamore tree, the Norway maple, and the horse-chestnut are usually the most serious. The American sycamore is sometimes entirely defoliated by its leaf spot. The leaf trouble of the Norway maple is usually most serious with young trees in



TWO SPECIES OF FOMES

These are found on a large number of deciduous trees and a few evergreens. Members of this group attack beech, maple, yellow birch, sycamore, ash, and black locust.

the nursery. The tender young leaves and shoots are attacked, causing them to turn black and to wither very much, as in the case of severe attacks of plant lice or conditions caused by long, severe droughts. The cherry leaf spot differs from the others, in that it exists as a circular hole in the leaf rather than as an area of discolored tissue. For this reason it is known as the "shot-hole" fungus. The wild cherry is the one most frequently attacked.

Over large areas there is no practical method of controlling leaf spots. With highly valuable park or street trees the trouble may be controlled in one of the following manners:



FUNGUS ON LOCUST TREES

Collect and burn the leaves of all infected trees.

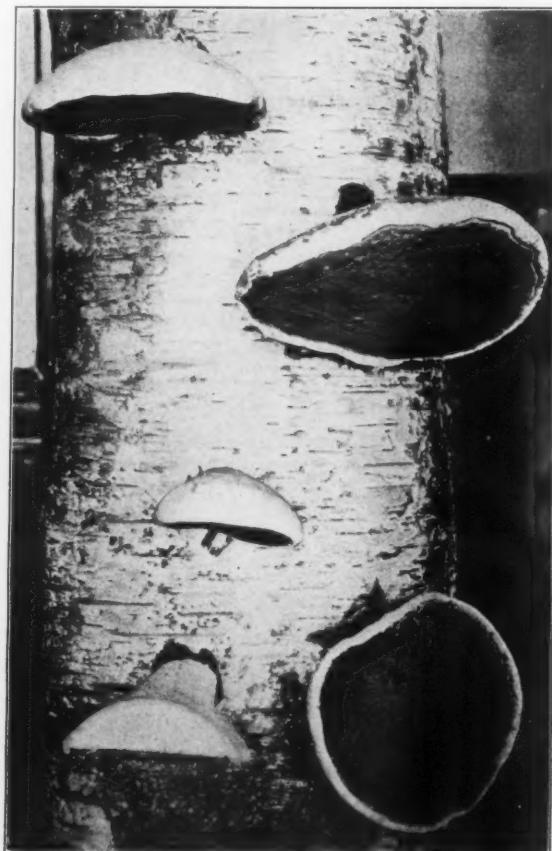
Spray the trees at the beginning of the growing season, when the buds are unfolding, and again in July, using a standard fungicidal spray. Lime-sulphur would be effective and safer to use than Bordeaux mixture, which sometimes burns the foliage.

FUNGUS DISEASES ATTACKING THE STEM AND BRANCHES OF TREES

This class of fungi may be roughly grouped into the three classes which have been given above in this article. Of these, the rusts are perhaps the most interesting. The

peculiar interest of the class lies in the fact that most species do not complete their life cycle on a single host plant, but require two distinct plants. A few of the most important and interesting of the class are:

1. The Cedar Apple, attacking our common red cedar and trees such as the apple, hawthorne, and shad-bush. This disease frequently gives apple growers great concern, as it causes much loss from "scabby" or otherwise imperfect fruit.



A WELL-KNOWN SPECIES

These produce a decay which, in most instances, necessitates tree repair. The directions for overcoming them should be carefully read.

2. The White Pine Blister Rust, attacking the stems of white pine and the common garden currant or other members of the genus *ribes*.

3. The Fir Rust, attacking the leaves and twigs of the balsam fir and other plants not yet discovered. This disease causes the familiar Witches Broom of the fir.

4. The Spruce Rust, attacking Norway spruce and the leaves of the rhododendron and mountain laurel.

CONTROL OF RUSTS

These diseases may be controlled by the removal of one of the host plants or by the application of fungicidal sprays at the proper season. The first method is a rather heroic one and is therefore usually supplanted by the second. Spraying for rusts will vary slightly with the

latitude, species, etc., but in general an annual spraying with a fungicide at the beginning of the growing season will be effective.

The stem and branch fungi with inconspicuous or hidden fruiting bodies form a small class, but contain several very serious tree diseases. Those of interest to the arborist are:



FUNGUS DISEASE LEADING TO A HOLLOW TRUNK IN A VALUABLE OAK TREE

1. Chestnut blight, which is the most serious of all our tree diseases. It is well understood and does not warrant any elaboration at this time. It is perhaps sufficient to say that its remedy has not been discovered, and that it bids fair to exterminate our only native chestnut.

2. The hardwood canker is a stem disease of hardwoods closely resembling the chestnut blight in appearance and methods of attack. It is particularly common on the horse chestnut. The trouble may be partly controlled by pruning away the infected portions and prevention of wounds, since the disease enters through them.

3. Black knot, a familiar disease, attacks practically all the cherries and is particularly common on wild and red cherry. The fungus causes black knotty growths over the crown, usually the smaller branches, often killing the tree. A careful pruning away of the infected portions early in the spring, and again late in the season, should control the trouble. An application of Bordeaux mixture in the late winter and one in the spring when the buds begin to open should be a further guarantee of success.

The stem and branch fungi with large and conspicuous fruiting bodies (the wood-rotting fungi) form a large class, and they produce the decay which in most instances necessitates tree repair. While the fruiting bodies of this disease are a key to this class it should be remembered that the disease may be present for a number of years without forming fruiting bodies. The diseases are included in four large families, and there are about twenty-five important species. Of this number the most important ones attacking deciduous trees are:

1. Dadalea, with three species, common on oaks.
2. Polyporus, with six species. The striking "sulphur-like" fungus is perhaps the most interesting and dangerous of the group. It is found on oak, ash, locust, and

butternut. Another important one of the group is a white hooflike fungus which is quite common on gray birch. White rot of red cedar is another dangerous disease.

3. Fomes, with nine important species, found on a large number of deciduous trees and a few evergreens. Members of this group attack beech, maple, yellow birch, sycamore, ash, and black locust. Of the evergreens, pine, spruce, and fir are attacked by tinder fungus or rot of conifers.

When one becomes interested in the diseases of this class they have usually developed to such an extent that the only practical solution lies in tree repair. Chisel and gouge must then be used to remove all diseased material, and a water-proof concrete filling put into the cavity. Other suggestions of value would include the following:

1. Destroy all fruiting bodies and infected parts.
2. Avoid the making of wounds, and properly treat all wounds that are made in pruning.
3. Practice clean culture generally, aiming to keep all trees in the most vigorous condition.

DISEASES OF THE ROOTS

From our point of view, only two important diseases are included in this group. They are:

1. Root rot, attacking the roots of a large number of conifers, including red and white spruce, balsam fir, arbor vitæ, Scotch pine, and larch.

2. The honey agaric, attacking the roots of a large number of coniferous and broad-leaved trees.

No valuable means of controlling these root diseases has been suggested.

In concluding it is probably safe to say that fungus diseases will give the arborist little concern where the trees are kept in a vigorous condition, and where clean culture is practiced. Tree diseases resulting from the attacks of fungi are usually secondary, following insect damage, starvation, breakage, abrasion, or some similar cause.

QUESTIONS AND ANSWERS

Q. Please advise me in regard to shag bark hickories, whether they can be successfully grafted, and if so whether grafts from trees bearing high grade thin shelled hickory nuts can be obtained and at what season of the year the graft should be set. Also please give instructions for the proper setting of the graft. Also please advise me in regard to the setting of white pines, at what season of the year they should be set out, where they can be obtained and any instructions for setting the trees, etc.

E. P. McK., Binghamton, N. Y.

A. I cannot give you much information on the first part of your question, but would suggest your writing the P. J. Berkman's Company, Augusta, Georgia, who specialize in grafting pecans. Dr. W. C. Deming, of Georgetown, Connecticut, who is secretary of the Northern Nut Growers Association, will also be able to put you in touch with some one who can answer your question fully.

To your second question, white pines can be set out

best in the spring. From the 15th of August to the 15th of September is another period when white pines may be planted, but the spring is preferable. In seedling size they may be obtained from any of the nurserymen advertising in the AMERICAN FORESTRY MAGAZINE. As for instructions, we might suggest the following:

As soon as the trees arrive, the bundles should be untied and then immersed in a pail containing water mixed with soil. The bundles should then be "heeled in"—which means placing them in the ground temporarily until they can be set out in their proper places. In "heeling in" the individual bundles should be slanted with their tops toward the South. A cool, shady spot is preferable for "heeling in" purposes. At no time should the plants be exposed to sun and wind and they should always be kept moist. The plants should then be set out in the field at a distance of about six feet apart. If it is larger trees that your question refers to, they may be obtained also from any of the nurserymen mentioned in the advertising pages of this magazine.

Q. I have a large farm near here and am anxious to plant it to nut trees, if they will do well, as I believe I can make more profit out of it in this way, though it is good farming land. Can you advise me as to what trees it would be best to plant, if any, or what your feeling would be in the matter. Also, I would like to know if there is any branch of the Agricultural Department through which I could get some young trees cheaply, or would it be best to purchase them from some nursery here?

E. H. J., Detroit, Mich.

A. If you lived in Indiana or Virginia, your planting of nut trees for profit would be experimental, but living on the northern edge of the Northern belt, for most nut trees the location is such that nut growing is entirely experimental, with the chances against any great success. It will be interesting as an experiment, but almost hopeless from a commercial standpoint. I believe in the development of the native nuts of any region more than the introduction of exotic species. There is a human tendency to want to grow cocoanuts in snow banks, and to overlook, or even despise, the ordinary fruits that grow wild and familiar all about us. I am perfectly frank in advising you in this matter.

Regarding the nursery stock, cedars, pines, beech, maples, etc., there is no branch of the government departments through which these could be secured, and I should advise your securing them from some first-class nursery in Detroit, or one of those which you will find advertising in this magazine. Let me warn you, however, to be particularly careful about the buying of white pine seedlings. You will note in our February issue an illustrated article telling of the blister rust with which white pines are threatened. This is a serious menace.

1. Q. What criticism have you to make of a list of suggested shade trees for street planting in New York State composed of the following: Oriental sycamore, sugar maple, Norway maple, Occidental sycamore, tulip tree, sweet gum, cucumber tree, silver maple, and American linden?

C. S., Tarrytown, N. Y.

A. I would revise the list as follows: Oriental sycamore, Norway maple, red oak, European linden and ginko for general planting in cities. There are other trees, like the pin oak, red and sugar maple, suitable for the more suburban districts. We have omitted the Occidental sycamore because it does not grow as rapidly and compactly, and it is not as free from disease as the Oriental species. The silver maple is too short-lived and too much subject to insects and disease to deserve consideration for general planting. The tulip tree and sweet gum require more moisture and rich soil than the average street can supply. The cucumber tree is not a street tree as far north as New York.

2. Q. I can get rhododendrons cheaply from Holland. Shall I purchase them in preference to nursery-grown stock?

J. B., Oyster Bay, L. I.

A. Nursery-grown stock is always preferable to that grown abroad, and planted out immediately upon arrival to this country.

3. Q. Don't you suppose that it would be better to purchase nursery stock rather than transplant wild stock?

K. S., Albany, N. Y.

A. Nursery grown trees and shrubs are better fitted for transplanting than those grown in the field or woodland. In the nursery, the plants are root pruned or transplanted at frequent periods—a process which decreases the long top root characteristic of the wild plant and develops large compact fibrous roots which help the plant to take to the new soil more readily.

4. Q. What kind of fertilizer shall I use for the trees set out last spring and when shall I apply it?

M. J. K., Philadelphia, Pa.

A. Use well rotted stable manure, preferably two years old. Apply now, though the fall would have been preferable.

ADVICE FOR MARCH

1. Prune fruit trees.

2. Prune fall blooming shrubs, but not the early flowering shrubs, or you will lose their bloom.

3. Before the leaf buds burst, spray for the San José scale with oils on badly infested trees and with lime sulphur on all fruit trees, whether infested with scale or not. Use oil at rate of one part oil, fifteen parts water.

4. Look for San José scale not only on all fruit trees, but also on lilac, Japanese quince, flowering dogwood, mountain ash and elm. Spray with oils. Obtain specific advice by submitting a sample of the insect to the State Agricultural Experiment Station or to the office of AMERICAN FORESTRY.

5. Remove and burn the cedar apples from red cedar. These produce the "scabby" or imperfect fruit on apple trees.

6. Spray silver maples with miscible oils for the cottony maple scale. Do not use oils on sugar maples.

7. Begin preparations for planting. Order your trees and shrubs from the nurseries if you have not already done so. Have your rich soil in readiness, and see that all the tools and accessories for planting are in good order for an early planting season.

The Moral Element of Conservation¹

BY CHARLES W. ELIOT

President Emeritus of Harvard University

ONE of the reasons for correlating national and State conservation in the matter of forests in the United States is that when a forest is taken charge of by the nation or by the state the good work is done for all time. It is a wonderful reward for any human effort that it ties itself to eternity; that the human effort is directed to an end of pure beneficence, and that end is going on and on—that the object is to be pursued generation after generation.

When the United States buys 1,372,000 acres of forest in the White Mountains and the southern Appalachians, it is setting aside for human use and enjoyment a tract which will never come again into private use. It is a perpetual benefaction to the successive generations of men.

It has been an enormous privilege that I have had to work through a life tolerably long for an enduring and growing institution of education.

Now there is an analogous satisfaction in working for the cause in which you are enlisted, and there is another satisfaction which perhaps those of you who have passed most of your lives in New England do not fully appreciate. It is an enormous satisfaction to feel that by labor done in such a cause as this you promote, for the benefit of future generations, the preservation of natural

beauty, of the immense beauty of the woods, and streams, and brooks, and of the rivers which are fed by the woods.

I have traveled through northern Africa, for instance, and also to the northern shores of the Mediterranean, and

to Constantinople by the Dardanelles, and into some parts of Asia Minor. All through these countries the general character of the landscape is treeless, with the exception of some cultivated groves, and there are few of them. The traveler in southern Japan today sees hill after hill, with no forests; their groves are artificial; their hills are not fertile enough to bear any crops useful to man. It is an extraordinary diminution of the beauty of the landscape, and it is also diminution of the opportunity of enjoyment for the inhabitants. Therefore in Japan the necessary adornment of a shrine or temple has not provided them with anything like the



DR. CHARLES W. ELIOT

President-Emeritus of Harvard University, who was re-elected a vice-president of the American Forestry Association at the meeting in Boston on January 17 and 18, 1916, and who made a notable address at the annual forestry dinner.

forests of New England or of the southern Appalachians.

The saving of the forests is a work of the highest utility also. Large trades and occupations of men depend on the forest, and it is a terrible waste we have been doing for our country to cut off the forests in order to bare the soil.

The chief element in conservation, whether of woods,

¹Address of Dr. Eliot at the joint forestry dinner at the thirty-fifth annual meeting of the American Forestry Association at Boston, Massachusetts, January 17 and 18.

water power or human health, is the moral element in it. And that moral element is conspicuously illustrated today in the comparative strength of the nations who are contending for domination, for rule, for power in Europe.

Conservation is built upon frugality, upon saving—the tendency in the mind and heart of the individual to postpone a present pleasure, a momentary gratification today or at this moment for the welfare of somebody in the future. Now that frugality is the very opposite of our American wastefulness in the treatment of American resources—a wastefulness which has characterized all the pioneer movements across our continent from the beginning. What wonderful and universal frugality has been shown by the French people. It enabled that nation to meet the terrible disasters of the Franco-Prussian war. It disappointed the German conquerors just because of the frugality of the French people. Bismarck thought he had bled France white, and that was a very good metaphor for what he thought he had done. But he had not "bled France white," as shown by the ease with which the immense indemnity was paid, and by the immediate recovery not only of political France, but also of commercial and manufacturing France. The same thing is being manifested today. The moral quality of the French people is built on two things—their frugality and their sense of public honor.

Now, our history has been just the opposite. Our people are characterized today by wastefulness, by extravagant expenditures for the enjoyment of the moment, without regard to the welfare of succeeding generations. We want to utilize today all possible resources without regard to the well being of the generations that are to succeed to the possession of this soil and this wide continent.

Thus I find the moral significance of these conservation efforts to be deep and broad. Their chief significance for one whose life has been devoted to public education is this moral significance. But then there are many other movements on behalf of conservation with which those promoting the conservation of our forests and the conservation of our water powers must necessarily sympathize, and I find that the various movements for the conservation of the public health of our people are all in line of this movement for the conservation of our forests, for the perpetuation of features of natural beauty, for giving access to the forest parts of our country for the purposes of outdoor enjoyments.

There are those who say that the conservation of the

health of the people and the conservation of the breathing powers of the people are the most important of all conservation movements; and indeed we may well admit the place there is for preventive medicine and for all efforts to promote and maintain public health, and the capacity of the populace for enjoying the open air and natural beauties.

Many men in all parts of our country have devoted much time and labor to this health conservation, and you may add to this happiness conservation for the masses of our people. This movement on behalf of the American forests is part of a widespread and deep-stirring movement for conservation in general of all those resources and all those powers which promote the health and happiness of our people.



SEVENTEEN PALMS SPRING

A famous water hole—not in the Sahara, as one might imagine from the photograph—but in the southern California desert.

SEVENTEEN PALMS SPRING

SEVENTEEN PALMS SPRING is a famous water hole of the Southern California desert, the revivifying water of which has brought renewed life and hope to many desert travelers, while it has been likewise the unreach'd goal of others whose bones have bleached the old overland trails—those who failed to get through. The spring would be considered but a poor enough watering place to those of us who know only the humid region with its multitude of water supplies and who would consider it an almost unbearable hardship to travel afoot for a single day without water. But to those who have gone several days and nights with no water and under a brazen sun and the mercury at 120° or worse in the shade the Seventeen Palms Spring is life itself. The palms from which the place receives its name seem to eke out a precarious existence and at present there are no longer seventeen of them, some having died; nevertheless, sickly as they appear, they are always a most welcome sight to man and beast traveling this desert route.



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EFFECT OF VIOLENT BOMBARDMENT ON TREES

Much of the recent severe fighting which marked the German attack along the western battle front occurred on the famous Height of Hartmannswillerkopf, in Alsace. This hill has been captured and recaptured by French and Germans nearly a dozen times, and has been subjected to frequent and heavy artillery fire. The photograph, taken on a hazy morning, with the smoke from heavy guns clouding the sky, indicates graphically the effect of artillery fire on the trees. Before the war this was a thickly wooded forest; now the trees which remain standing have had their limbs shot away and are exposed to insect and disease attacks in the many shot wounds which have shattered them.

Conditions in French Forests

A NEWSPAPER report to the Associated Press from Paris says: "The friends of French forests behind the lines have been reassured by the announcement that Fontainebleau shall not be touched and that the cuttings in other forests for the needs of the army are done by government foresters. The necessary timber for the front will be furnished without causing serious inroads. There is still considerable anxiety as to the fate of forests within cannon range, and behind the German lines. Civilians, evacuated forcibly by the occupying troops and finally sent back to France by way of Switzerland, state that trains bringing supplies to the army instead of returning empty carry back, among other things, immense quantities of the choicest timber of the departments of Meurthe and Moselle, the Ardennes, the Vosges and the Meuse.

"A year's systematic cutting in the estimation of competent authorities would furnish many millions of dollars' worth of timber without necessarily ruining the forests. All depends on how and where the cutting is done.

"Senator Julew Meline, who was born at Remiremont in the Vosges, where 37 per cent of the territory is timbered, and still lives there, says that the war ravages on the forests have been considerable along the battle front, but in proportion to the total wooded country are really insignificant. Some woods, like the Bois de la Gruree have been practically destroyed beyond hope of recovery, but in many other places, excepting among the pines, it is hoped that a great many damaged trees will survive.

"Forest fires are unknown in the region of the fighting, and no damage is anticipated from fire, no matter how intense the cannonading. The timber value of all trees standing along the battle front will have been greatly diminished by the numerous bullets in their trunks because the circular saws that easily went through the lead bullets in the trees after the war of 1870 break their teeth on the hardened projectiles of 1915.

"The timbered regions of France cover 18 per cent of its area and comprise more than 23 million acres. Fourteen per cent of this acreage is in the departments that have been overrun by the warring forces, and of that 14-

per cent more than half is still occupied by the Germans.

"The supposition that the destruction of forests was widespread," says Senator Meline, "arises from the profound impression that is produced by certain battlefields where the trees have been razed to the ground. When these regions are compared with the total of three and a half million acres of wooded land in the zone of operations the damage becomes less disquieting."

THE GINSENG DISEASE

THE disease known as mildew, Japanese mildew, or soft rot, which attacks ginseng plants, is found in every one of the fifteen States in which ginseng is grown, according to a bulletin just published by the plant pathologists of the New York State College of Agriculture, who suggest six methods for controlling and preventing the disease. One method, they state, is to spray the plants with a fungicide early in the spring, just as they are pushing out of the soil. They suggest Bordeaux mixture, 3-3-50, to which has been added 2 pounds of arsenate of lead for every 50 gallons of the mixture. The spraying should be continued until all the plants have appeared, and special care should be taken to thoroughly reach all parts of the new growth with the mixture. Other supplemental methods that are offered for controlling the disease include the removal of diseased plants or parts of plants, deep planting, rotation, sterilization of soil, and drainage to remove any accumulation of moisture, since excessive moisture favors vegetable rots.

STUDENTS TO PLANT TREES

THE Extension Department of the State College of Forestry at Syracuse University has been called upon to supervise the Arbor or Forest Day planting of two schools in the State, and will arrange for several others in the near future. The high school at Ellenville plans to set out several thousand pine and spruce trees on a portion of the city watershed, and the children of Pike Seminary, in Wyoming County, will plant a thousand trees on the waste land of a near-by farm. Last year eleven different schools planted from one to five thousand trees each under the supervision of the foresters from Syracuse.

A NEW CORRESPONDENCE COURSE

THE Extension Department of the State College of Washington, at Pullman, Washington, through the Department of Forestry, announces a correspondence-study course in "Lumber and Its Uses." The course has been prepared by one of the best authorities on the subject in this country, and is so designed as to be of special value to lumber dealers, contractors, carpenters and others connected with the wood-working industries. The price of the course is \$5.00, which covers the cost of the textbook and all other reference material. It also includes the correction and return of answers to questions as sent in by the students.

7,000,000 SEEDLINGS READY

DURING the month of January the Pennsylvania Department of Forestry completed taking inventories of the seedlings in its twenty-four nurseries. A growing stock of about 13,000,000 seedlings is reported, 7,000,000 of which will be available for spring planting.

An act passed at the last session of the Legislature gives the Forestry Commission permission to distribute free of charge within the State seedlings on hand in excess of the number which can be planted on the State Forests. At its last meeting the Commission voted to set aside 1,500,000 seedlings for free distribution in lots of 500 or more. These seedlings are to be used only for reforesting, and those to whom they are given must pay the cost of crating and shipping.

Requests have been received already for more seedlings than are available, and the department will be unable to meet the demand.

Of the seedlings which can be planted this spring, 4,750,000 are two-year white pine, 500,000 two-year pitch pine, 800,000 two-year Scotch pine, 100,000 one-year sugar maple, 800,000 two-year Norway spruce, and 75,000 one-year honey locust. In addition to these, there are available several thousand of each of several species not commonly used for reforesting in Pennsylvania, such as Japanese larch, Douglas fir, red pine, cucumber, and American elm.

"IF"

BY HARRIS A. REYNOLDS.

If you can toss a match into a clearing,
And never give a thought to put it out,
Or drop your cigarette butt without fearing
That flames may kindle in the leaves about,

If you can knock the ashes from your brier,
Without a glance to see where they may fall,
And later find the forest all afire,
Where you have passed—with no one near to call,

If you can drive your auto through the working,
And cast your stogie stub into the slash,
Unmindful of the danger therein lurking,
Or homes and happiness that you may smash,

If you can leave your camp fire while 'tis glowing,
No thought of industries that it may blight,
Or of the billion saplings in the growing,
Turned into charcoal e'er the coming night,

If you can start a fire beneath a brush-pile,
When the wind is roaring like a distant gun,
You surely should be shot without a trial,
And which is more, you'll be a *fool*, my son.

GEORGIA STATE FOREST SCHOOL

THE Georgia State Forest School at the University of Georgia, Athens, Ga., in charge of Prof. James B. Berry, occupies a twelve-room stone building, which has been fitted with the class rooms, offices, laboratories, museums and library necessary to the successful presentation of technical forestry. Four large rooms are devoted to museum purposes, each to some particular phase of forestry. The library contains a large assort-

ment of books on technical forestry and allied sciences, all of the Government and State publications, and a file of some fifty forestry, lumber, trade, and nature-study periodicals.

The freshman year is devoted to a consideration of those basic sciences, botany, inorganic chemistry, English composition, shopwork and drawing, dendrology and trigonometry. During the sophomore year the science courses are continued, while additional work in silviculture and surveying is introduced. In this way the student receives his elementary forestry work in dendrology, silviculture, surveying, and mensuration during the first two years of his course. This arrangement of the work, as well as the reduction of the course to a basis of major and minors, permits of the combining of two courses of study and the securing of two degrees. Thus, the Bachelor of Science in Forestry degrees may be obtained in five years.

Forest Camp is located in Fannin County, in the Blue Ridge Mountains of northern Georgia—and is situated on the Georgia Tract. The camp equipment consists of tents and buildings. Conditions for work in dendrology, mensuration, and surveying are ideal. The camp site is healthful, the country beautiful, the water abundant and pure, the atmosphere invigorating. A ranger school and a nature-study camp are also conducted at Forest Camp. The scope of the ranger school is limited to practical work in surveying and timber estimating for men in the Government serv-

ice and for practical lumbermen. The nature-study camp is open to teachers and to persons of mature years generally. A correspondence course in farm forestry is offered to citizens of Georgia who, because of time or expense, cannot attend the university.



EXHIBIT OF THE GEORGIA STATE FOREST SCHOOL.

This exhibit was shown at the Georgia State Fair and attracted a great deal of attention and favorable comment.

ment of books on technical forestry and allied sciences, all of the Government and State publications, and a file of some fifty forestry, lumber, trade, and nature-study periodicals.

The curriculum of the Forest School has been completely revised during the past year, and now approaches the ideal outlined in the standardization of courses. The number of credit hours has been cut to eighteen a year, which is considered as much work as the average student can carry and master. A fourth term has been added, however, to each of the first two years. The summer term is given in Forest Camp, Fannin County, and is devoted principally to field practice, thus securing the proper correlation of work. At the beginning of the junior the student is required to designate his specialization, and must select the courses he desires to pursue during the remaining two years. A major and a minor must be selected in forestry, a major from one of the departments of farm mechanics, agricultural botany, horticulture or botany, and twelve credit hours of gen-

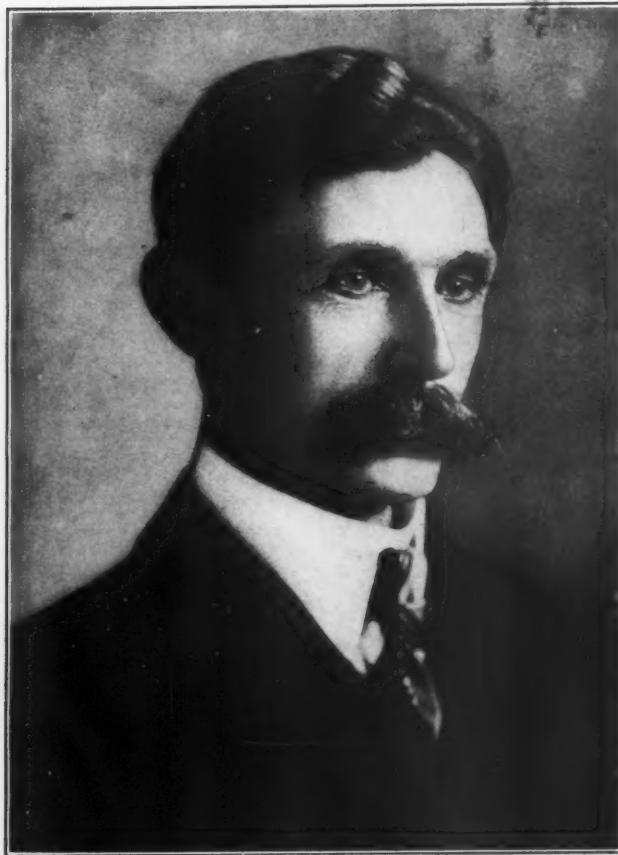
IOWA WANTS NATIONAL PARK

FEDERAL aid will be asked by the Iowa Forestry and Conservation Society, which met at Ames, Iowa, recently, for the creation of a national park in northeastern Iowa, along the Mississippi River, the Switzerland of the Middle West, says a newspaper dispatch. Senator Kenyon already has started the movement in Washington, and Iowa, Wisconsin, and Minnesota Senators and Congressmen are expected to help. Governor Clarke, of Iowa; State Forester Cox, of Minnesota, and other prominent men have indorsed the movement.

JOSEPH AUSTIN HOLMES—AN APPRECIATION

By W. W. ASHE

DOCTOR HOLMES, or Professor Holmes, as he had been known for many years to those intimate with him, was not a forester, but the annals of the forestry movement in the United States are incomplete without mention of his influence as advocate and propagandist. He was for many years a prominent member of the American Forestry Association, representing the State of North Carolina as one of its vice-



JOSEPH AUSTIN HOLMES

Chief of the Bureau of Mines, Department of the Interior, who died recently, was an ardent forest conservationist, and did much to further the movement for the Appalachian National Forests.

presidents. As State Geologist of North Carolina, he incorporated forestry in his program upon the reorganization of the North Carolina Geological Survey in 1891. With an allotment for this branch of work which seldom equalled \$1,500 a year, both for salaries and expenses, he maintained this department, although with many breaks, for more than ten years, or until he practically severed his official relations with the State.

Under his direction the forestry work was developed along the lines of conservation, although at the date of its inception the greater portion of the forest resources of western North Carolina were considered inaccessible and unavailable for exploitation. Nevertheless, while urging forest exploitation, as was required by law, there was

uppermost in his mind the conservation of this enormous resource, on which not only the valuable water power of the State was dependent, but from which ultimately the raw material could be drawn for developing and permanently maintaining an extensive wood-working industry. Under his direction, studies were made to determine the value and quality of turpentine collected by the then customary method of boxing and by the use of the cup and gutter, the object of which looked not so much at that time toward saving the small bodies of untapped old pitch pine timber which yet remained in North Carolina

as toward showing the possibilities of young timber and as an incentive to its protection. In this connection the reforestation of denuded long-leaf pine lands, both by natural restocking and by planting, was considered. A study was made of the growth and methods of management of the short-leaf pine of the coast (*Pinus taeda*), the results of which have only recently been published. With Mr. Holmes' sanction, studies were made also of the forest flora of the southeastern United States, especial attention being paid to that of the southern Appalachians. Testimonials of his interest in these studies are a well-known hawthorn which bears his name, *Crataegus holmesiana*, and a hickory, *Hicoria (Carya) holmesia*.

The most important forestal project with which his efforts will be associated is the establishment of the Appalachian National Forests. For several years a large portion of his funds available for forestry work was utilized in cooperating with the Federal bureaus in making the preliminary examinations in furtherance of this measure. The many features of value of the Appalachian Forest appealed to him—their promise, their influence in regulating stream flow by protecting the headwaters of important rivers flowing in so many directions, their elemental beauty and recreational significance, their interesting botanical and silvical characteristics. He understood the complexity of the problem of their management and realized the necessity for their rescue by the Federal Government if they were to be saved for the use of the people. If not the original proponent of this far-reaching and vital policy, he was certainly one of its earliest advocates, and forthwith became the protagonist of the movement. His agitation of this plan began more than fifteen years before the passage of the Act of March 1, 1911, which authorized the purchase of mountain lands for eastern National Forests, and his interest in the project continued unabated until it was realized.

The stimulus which Doctor Holmes, by his enthusiasm, imparted to forestry in the South and East will be felt for a long time to come, and well supplements his broad usefulness as director of the Bureau of Mines. While the promotion of forestry was only one of the many directions in which his energy was expended, the impetus which he added to the movement must always be considered as one of his achievements.

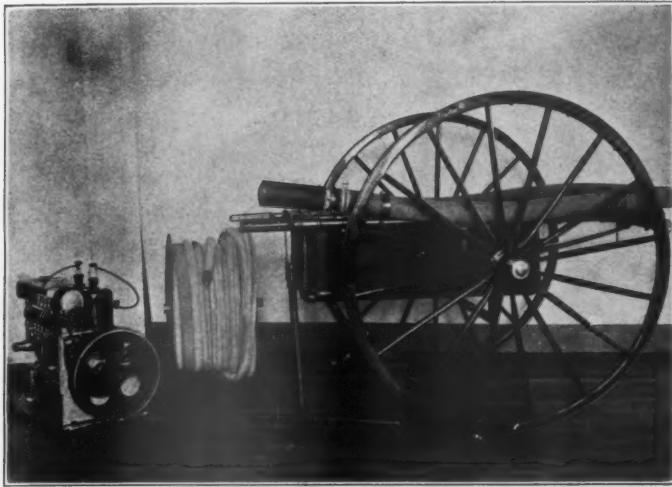
Mechanical Fire-Fighting Equipment

BY G. GERALD BLYTH, *Dominion Parks Branch, Ottawa, Canada*

FIRE protection in the Dominion Parks situated in the Rocky Mountains of Western Canada presents many interesting problems, one of the most difficult being the delivery of water to a fire. The old-fashioned

made of several different engines, a suitable one was finally decided upon; one of from four to five horsepower, two cylinder, equipped with a Bosch magneto. This engine was mounted on an aluminum base and direct connected to a rotary pump made of bronze. The engine has a speed of approximately 1,200 r.p.m. The pump has a suction port 2 inches, and a delivery of 1½ inches in diameter. The maximum water pressure is about 100 to 125 pounds at the pump, which is capable of delivering water through 1,000 feet of 1-inch rubber hose, or 1,500 feet of 1½-inch unlined linen hose. The engine and pump weighs but 118 pounds.

Suitable means of carrying this outfit over wagon roads in the parks, as well as over trails, and even through the bush, had to be considered. A truck was therefore constructed similar to the illustration, on which the engine and pump were mounted. A special auxiliary truck was also constructed for carrying the balance of the hose assigned to the unit. The engine truck, besides carrying the engine and pump, also carries 200 feet of 1-inch rubber-lined hose, tools, gasoline, oil, carrying handles and straps. The

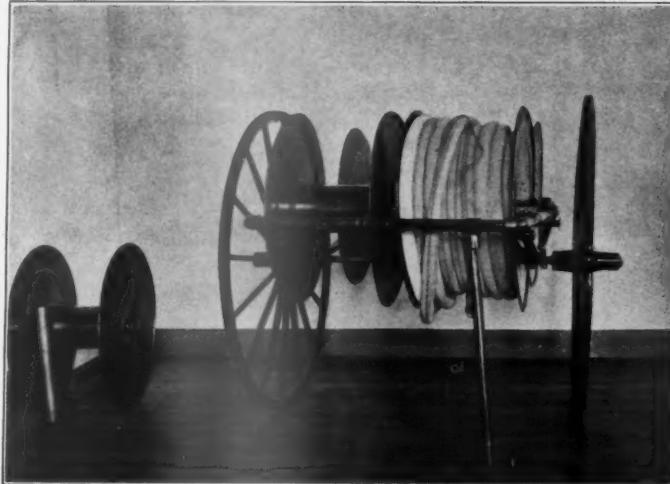


AN AID IN FIGHTING FOREST FIRES

On the left a two-cylinder, four to five horsepower gasoline engine and pump. This can be mounted on the truck. It develops about 125 pounds of pressure through one thousand feet of hose. The outfit can be hauled by horse or man power and is most efficient in forest fire fighting.

fire-fighting equipment, namely, the ax, shovel, mattock and canvas water bucket, whereas absolutely indispensable, must soon pass into the background to be superseded by more effective equipment of a mechanical nature. It has been found by experience that it is exceedingly difficult to completely extinguish a fire without the application of water. Carrying water to a fire by manual labor in pails or buckets is, as a rule, a laborious task, and, indeed, in some cases almost out of the question, especially up a steep mountain slope. The need of a more efficient method of carrying water to a fire and distributing it sparingly thereon has been apparent for a considerable time, and to meet this want the Department of the Interior of Canada, Dominion Parks Branch, has recently designed and constructed a portable gasoline pumping unit, equipped with 1,000 feet of one-inch rubber-lined hose, which, it is confidently expected, will fully measure up to the expectations of those associated with its construction.

The gasoline engine market was carefully searched for a light and thoroughly portable gasoline engine of the two-cycle type. After a careful investigation had been



THE HOSE TRUCK

This is an auxiliary to the engine truck and has four metal reels mounted on spindles each having a capacity of 200 feet of one-inch hose. Each reel is detachable and quite portable.

truck can either be hauled by horse or man power, and the wheels have a gauge of 3 feet 3 inches. When the country becomes too rough to permit of carrying this equipment on the truck, the engine and pump are

carried by two men on a wooden stretcher, aided by shoulder straps. The hose truck has four metal reels mounted on spindles, each having a capacity of 200 feet of 1-inch rubber-lined hose. Each reel is detachable and is quite portable. The reels on the hose truck are interchangeable and are exactly similar to the one reel mounted on the rear of the engine truck. The unit with its auxiliary truck carries 1,000 feet of hose in all. The auxiliary truck is capable of being hauled by man or horse power, as conditions will allow. Fifteen hundred feet of 1½-inch unlined linen hose were also purchased and sent out with No. 1 outfit, and tests will be made in the field to ascertain which type of hose is most serviceable and efficient. The linen hose is considerably lighter in weight, less bulky, and consequently much more portable. If the linen hose is found to be more satisfactory a specially constructed hose truck will require to be built or the present one modified.

In tests held in Ottawa before the unit was shipped West to the Dominion Parks, the outfit pumped a powerful stream through 450 feet of hose, lifting the water up 170 feet. The idea is to have several such units available at the headquarters of the park in which this unit is now stationed. If a fire occurs a considerable distance from a railway, road or trail a sufficient number of gasoline pumping units, each equipped with 1,500 feet of hose, can work in relay fashion, pumping from the source of water supply into a canvas tank to a second outfit, which would have its source of water supply from the canvas tank; in this manner water can quite easily be delivered to a fire a mile or so from the nearest available supply.

A Ford chassis was also purchased and a suitable carrying box constructed. This car will be kept solely for fire-protection purposes and is so arranged that the portable gasoline pumping outfit and hose, etc., may be mounted thereon.

This unit was built as an experiment, and much interest will center around it during the coming field season, while it is undergoing a thorough practical test in the Rocky Mountains Park. If the outfit proves successful, it is hoped that further ones will be constructed and a standard design adopted. If successful, this is not all, as one of the most difficult problems in fire protection, namely, getting water to the fire, will have been solved.

FOOD TREES

BY ALICE M. LONG

MOTHER, some bread and butter with marmalade would taste pretty good."

"Well, go out to the trees and pull them, son."

And that is just what one might do if he were living in a tropical country where three certain kinds of trees were growing in the yard.

The farmer might find it more profitable to cultivate these trees than to grow wheat; father wouldn't find it necessary to work so hard for daily bread for himself and loved ones; mother wouldn't have to remind herself

to make up the sponge for the family baking; neither would she be obliged to toil over a hot stove on a hot day to make marmalade to satisfy Robert and Annabel's sweet tooth.

The bread fruit tree, although a native of South Asia, the Indian Archipelago and the South Pacific Islands, is also grown in some of the West Indies.

The fruit of this tree is round. It weighs about four pounds and is covered with a rough rind. When ripe it is juicy and yellow, though it has a better flavor before it is fully ripe.

Bread fruit is very nourishing and is the principal food of the South Sea Islanders. After it is cut up and baked it is white and mealy, strongly resembling our own wheat bread.

One would scarcely except to find butter growing on trees, but this is what you would see if you were to look for the Shea (she'a), or butter tree, which is a native of Africa.

The nut of this tree is enclosed in a soft pulp which is covered with a smooth skin. The pulp is sweet and nutritious and a large percentage of the nut is butter.

In addition to the "bread spread," if a man wants a light at night he can depend upon his she'a tree for candles, while from it there may also be produced sufficient soap to insure the practical expression of "cleanliness is next to godliness."

Marmalade—Mm! Think of picking all the bread you want from one tree, getting a generous supply of butter from another and then from still another tree a delicious spread of marmalade over these, just as thick as you want it.

The tree which furnishes this sweet is a native of the West Indies.

But this isn't all. Suppose you want at the last of a wholesome meal something that leaves an exceptionally good taste in the mouth. Why, then, just step over to the little custard tree or shrub for your dessert. You will find hanging upon it fruit balls about the size of a small orange, enclosed in which is a soft yellowish sweet pulp.

A near relative of the custard tree is the Sour sop, though its somewhat acid fruit might better serve as a first course at breakfast.

But after all, are these rather remarkable trees more wonderful than the many with which we are familiar? Is there anything more strengthening than the nuts growing wild in our forests and under cultivation upon plantations in many parts of our country? Are they not wholesome and palatable substitutes for flesh? Then, all credit to the "meat" trees.

Can we find anything more delicious than our native apples, pears, peaches, cherries and other ready-to-eat fruits, too numerous to mention?

Would it not broaden our ideas, awaken our higher selves, and bring us into sweet harmony with all things that live, grow and have being, by giving more thought to what nature does for and is to us?

Uses of Lumber

BY WARREN B. BULLOCK

IN all the talk of "war babies" of the months since the European war broke out in all its fury it has been supposed that the steel and metal industries were those which were chiefly feeling the increased prosperity, due to a demand for the products of steel mills for shells and other equipment, and of the copper smelters for various war uses of that metal. It is generally supposed, even today, that the prosperity in war supplies is directly applicable chiefly to the metal plants, but the trouble abroad has produced some unique uses for various woods, as well as steel.

It was for the Wisconsin manufacturers of birch to discover that they could find a fine market for their wood in the gun factories. In the days before the war, when rifles were not being made in such enormous quantities as at present, the demand was chiefly for black walnut. The supply of this wood, however, had decreased until it was rare in some parts of the country, and the demand for a substitute was strong even before the war. The summer before Europe's conflagration burst out, the writer was in Kansas, and found that there was a handsome demand there for black walnut stumps. In eastern Kansas, be it known, the black walnut was in days gone by in great demand for rail fences. Large quantities of this wood, now of great value, were used for this roughest of purposes. But with the shortage of supply came the discovery of Kansas farmers that their old stumps were fine material for gunstocks. On this Kansas trip the writer saw carloads of stumps waiting for transportation to the East for conversion into stocks. Prices paid were high, it might be added, as these butts, dug from the ground and trimmed, were just the size needed for the gunmakers. Whole train loads went East, so the supply, even of stumps, was nearly gone before the great demand for wood caused by the war.

When firearms manufacturers began looking for some wood to take the place of the reliable old walnut, the attention of Northern timber owners was called to their birch, especially the cherry, or shell-bark birch, as it is known in the country where it grows. Tests by various standards were made of birch for gunstocks, and it proved entirely suitable. So the Wisconsin association of manufacturers who handle birch and other hardwoods sent telegrams to firearms manufacturers all through the East, suggesting that birch be considered.

The result of this campaign was instantly apparent. Prices have jumped to as high as \$60 per thousand feet, delivered in the East, for birch of the proper thickness for this use, and sales are still being made of Northern birch for this purpose.

IF Kansas has lost its trade in black walnut for guns through the destruction of the source of supply, there has been found a new use for one of the other woods of Kansas, Oklahoma, Missouri, northern Texas, and other Middle Western States in the Osage orange. This wood, hardly more than dwarf tree and never grown artificially except for hedges and wind-breaks, has been found to be of practical use in meeting the shortage of dyestuffs due to the same war conditions which made a new market for birch. Experiments by forestry experts and chemists disclosed that the Osage orange contains color which can be converted into a long series of dyes of the yellow shades, ranging from brown to tan, and which seem to be effective in wool or silk fabrics. The tests have not as yet been worked out extensively chemically, but several dyestuffs concerns are preparing to develop this new field with the cessation of shipments of dyes from abroad and the consequent famine in the color market in America.

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THE series of experiments in wood preservation which have been carried on for several years by various experts have developed the fact that there is a woeful lack of facilities for the average user of lumber to properly treat the wood he wants to use in places where it will be especially susceptible to decay. Creosote, which has been found to be the most valuable preservative, has been sold only in large quantities, making its use difficult for the farmer or small miscellaneous user of wood, who is in greatest need of the preservative. In response to this demand, some creosote companies have at last arranged to put out creosote in small quantities. This sale of creosote oil is now to be commenced through local retailers, as the manufacturers have arranged to put out their oil in five-gallon cans or barrel lots at reasonable prices, and in such form that the oil can be used on the farm or on the spot by building contractors.

* * * *

TO revert to the talk of "war babies," there is a belief among hemlock manufacturers of the North that large contracts for yellow pine by European governments are partially responsible for the recent increase in demand for hemlock. The use of yellow pine for trench work, both as timber for the building of dugouts, the sustaining of dirt roofs and the boards for other trench purposes is said to be extensive, and especially so during the last few months, when the prospect of a winter in the trenches or underground forced radical steps for the comfort of the soldiers. The first year of the war largely exhausted the home supplies of timber for such purposes, and heavy shipments of the

yellow pine abroad reduced the supply in the Northern markets, where it had previously held sway as a strong rival of the Northern white and Norway pine, hemlock and other timber.

* * * *

UNEXPECTED assistance came in February to the campaign of American lumbermen for the right to cooperate in preserving standing timber, from no less a source than President Charles R. Van Hise, of the University of Wisconsin.

His report to the lumber industry in one of its most vital points came in his address before the Wisconsin Commercial Congress, when he declared that an amendment to the Sherman anti-trust act was vital to the business future of America. The lumbermen of the country in recent hearing before the Federal Trade Commission declared that they believed that the conservation of American forests could best be obtained by governmental recognition of the fact that the lumberman should be

allowed to cooperate in curtailing lumber production to an extent which would bring a reasonable profit on stumps. At present, owing to the competition and lack of such cooperation, it was claimed that lumber is being cut in the most wasteful fashion at an actual loss, the cream taken and the less valuable left. The lumbermen believe that cooperation under Federal regulation should be permitted to force proper conservation methods in cutting timber, and thus protect the forests for the future.

With this view President Van Hise agreed, though not specifically mentioning the lumber industry, when he declared that the first section of the Sherman law should be so amended as to mean "restraint of trade that is detrimental to the public welfare." He said this was the only solution of the problems relating to big business. The retention of competition, permission for cooperation and regulation of such cooperation were recommended in his address. Cooperation, but not to such an extent that it becomes restraint of trade, he declared to be the greatest need of business today.

Town Forests and the Lincoln Highway

BY HARRIS A. REYNOLDS

IN the ornamentation of the great national monument, the Lincoln Highway, trees, shrubs and vines must play an important part. The planting of forests or the reservation of some of those now in existence along this highway is also necessary.

The early years of Lincoln were spent in the woods. Much of his life was associated with frontier conditions. Therefore, in the decoration of this highway to commemorate his life, what would be more fitting than the establishment of permanent forests? Town forests, managed on scientific principles, would serve in many ways the communities in which they were located, and such management would guarantee their permanence.

In Europe are town forests over 1,000 years old, and they are more valuable and probably more beautiful today than ever before. They certainly are more appreciated now than at any time in the past. Those forests are not only self-supporting, but they return a handsome income to the municipalities. As wild parks, they have few equals, and their recreational value cannot be estimated in dollars and cents. Many of them are bird and game sanctuaries as well.

The idea of cities, towns and villages owning and controlling forests is comparatively new to this country, but its rapid realization is most remarkable. In the past five years no less than nine States have passed laws enabling their cities and towns, and in one case the counties, to acquire and control forests. The movement is recognized as one of the great forces, if not the greatest force, for conservation that has been brought forth. It will bring the value and necessity of conservation nearer to the individual, who must eventually begin to conserve

the natural resources of this country. The number of places that have actually established such forests is small as yet, but many communities now have the matter under consideration.

Several of the States which have laws permitting such ownership of forests are traversed by the Lincoln Highway. Other States are certain to pass similar laws in the near future. Why, then, should not the cities and towns that are favored by their location on this great road begin at once, where it is possible, to acquire lands adjacent to or in the immediate vicinity of this highway, with the object in view of creating forests on them? The advantages that town forests bring to communities are obvious enough. One need but glance at the hundreds of splendid examples in the various countries of Europe to be convinced of the value of the proposition from the economic standpoint. The experiment has stood the test of time.

Difficulties will be encountered in the establishment of town forests as a matter of course. But with State legislation permitting such action by the municipalities those obstacles will be purely local. The advice of the State Forester as to the selection of the proper site can be obtained usually without cost. It remains for a public-spirited organization, such as a board of trade, improvement society or woman's club, in each locality, to head the movement; and public sentiment can readily be aroused in favor of any worthy undertaking of this nature. The women's clubs are already committed to the work of beautifying this highway. Plans are being made. It would seem that the creation of a town forest

near the highway in each community could well become a part of the general plan of beautification.

We shall not discuss here the actual benefits that would accrue to the town from such a forest, but how would it affect the highway itself and the millions of travelers who will pass over it in years to come? The more beautiful the highway, the more popular it will be. Imagine yourself one of those travelers passing through certain forestless, if not almost treeless, regions of some of the Middle States, or a cut-over, burned-over section of Pennsylvania! What a relief it would be to pass at intervals through stretches of beautiful forests! They would surely lend variety to the landscape and comfort to the traveler. Especially would this be true if he could stop for refreshments in the cooling shade of the forest, just as the visitors to the European town forests can do, and enjoy the music furnished by the feathered orchestra of the woods.

It has already been suggested that provision should be made to establish an abundance of bird life along the route. This cannot be done on an effective scale unless wooded areas are provided. Shade trees and shrubs alone would not attract the birds. On the other hand, forests, under proper management, will contain enough undergrowth to encourage nesting, and an area set apart in each town as a forest could readily be made a bird sanctuary. State legislatures should carry this work further by permitting and assisting owners to establish bird and game sanctuaries on all woodland property in the vicinity of this highway. The birds soon learn where the safety zones are, and such sanctuaries distributed along this route would soon result in a population of songsters.

Nothing is more pleasing to the average person than the beauties of the forest, with all the comforts and enjoyments that naturally accompany it. If some thought is given to the landscape treatment of the forest, the result can be made all the more pleasing. In the development of town forests, such as we are advocating, the areas immediately adjacent to the highway should be given special attention. By the careful selection and artistic arrangement of the species, the creation of attractive vistas, and the application of the principles of silviculture the most picturesque effects can be obtained. The towns will naturally do all in their power to make the highway beautiful, and it is to be hoped that the creation of town forests will be incorporated in the scheme of decoration for this great National Monument.

LUMBER COMPANY'S GOOD ADVICE

MR. W. L. GROOM, president and general manager of the Tar River Lumber Company, of Rocky Mount, North Carolina, on being asked by AMERICAN FORESTRY to write his advice, based on his company's successful experience in preventing forest fires, said:

"It is certainly high time that every American should know or be taught the danger and loss by forest fires.

Nothing should be left undone to educate our people to this real, important fact.

"I will briefly touch on how to prevent, not about what has happened, but how to avoid a reoccurrence, of forest fires:

"First. Lumbermen operating logging locomotives, using coal or wood, can do so much to prevent fire by raking back, say, 80 feet from their track when it passes (as is usually the case) through the forest and burn all leaves, straw and other material that will take fire. Then by all means equip their locomotives with the very best device they can buy to keep the locomotives from throwing sparks (and, by the way, the best thing I have tried is the South Bend spark arrester, made by the South Bend Spark Arrester Company, South Bend, Indiana); also to use all possible means to prevent employes from carelessly putting out fire.

"Second. Farmers should make it a point to see that their tenants or employes do not start fires they cannot control. While to clean up land a fire is as much needed as a plow, *it must be controlled*. Fire is a very important thing, but good judgment must be applied in its use. Many a splendid neighbor has been made much poorer by some careless fellow letting a fire get away. Seldom do we hear of one farmer paying his good neighbor's damage when he or his hands have let fire get away and damaged him.

"Third. Hunters should more fully understand how to protect our forests and what a destructive forest fire means. Thousands of dollars' damage has been done by fires that have started from a match, a lighted cigarette or cigar that has been carelessly thrown away in the woods.

"Lumbermen operating locomotives and stockholders holding stocks in railroads have, to my mind, paid out many a dollar for fire claims when fire was put out by others than their employes. These people have had a hard time in the past. Let's all do our best to cut out this big fire loss, and let's see who can report the least forest fires in their section during the year 1916."

WOODMAN, CUT THAT TREE

THE following verse, written on the inspiration of the moment, upon hearing a recitation of the well-known poem, "Woodman, Spare that Tree," is teeming with sound advice, and in six lines delivers a sermon on forestry which should be far-reaching:

Woodman, cut that tree;

It's dead and takes up space.

Put the money into more.

Plant another in its place.

Plant your old pastures to white pine—

That's what I'd do if they were mine.

J. HARRY RICH.

Editorial

STATE FORESTRY ORGANIZATIONS AND PROBLEMS

A FORESTRY policy for a State is founded on the protection of forests from destruction. Before the development of State forestry, the acreage burned annually and the damage done was appalling, and was reducing a great proportion of our woodlands to desert conditions. It has been the task of State forestry departments to cope with this situation, and by education, organization and law enforcement gradually to obtain a strangle hold on forest fires. Then comes the great work of suppressing insect depredations and injurious diseases, one of which, the white pine blister rust, is just assuming dangerous proportions. To render the forest *safe* is the first step.

Next in importance comes the task of educating land-owners to take care of their forest lands, and to use them for the production of timber crops. There are many ways of attacking this problem. Circulars and bulletins with useful information reach many; lectures, if given by persons who have real information to convey, bring the question home to others; but there are still more practical means of spreading the gospel of forestry. The growing and distribution of tree seedlings at cost for forest planting is a help. Even more effectual are object lessons in planting upon State lands purchased for the purpose, such as is carried out in New Hampshire and Massachusetts.

The final problem in State forestry is that of State ownership and management of a certain amount of waste land in tracts large enough to show the commercial and practical possibilities of forestry. This policy Massachusetts, Vermont and Connecticut have adopted, and in other States it has been developed to include ownership and management of over three million acres, exclusive of the purchases of the National Government in the East, now totalling over a million acres.

To carry on and develop a successful and well-rounded State policy, the entire work must be in the hands of men who understand what it is all about, and who can proceed with the certainty which comes from training and education toward the attainment of definite, clear-cut objects. Not only that, but the work must pay. The returns must be adequate for the expenditures in whatever line the appropriations are directed. Efficiency is the watchword of the hour, and the blundering, waste and excessive cost of inefficiency, due to lack of adequate training, is just as criminally inexcusable in our internal affairs as it would be in waging war.

The result of inefficiency and waste, if too long continued, will inevitably be either the abandonment of the enterprise, if it is considered unessential, or the enforced reorganization of the management, so that results vital to the Commonwealth may be secured.

In the present stage of development of forestry its magnificent opportunities and the vital bearing of its economic relations to our future social health are only dimly perceived by legislators, and, facing a crisis arising from mismanagement, it may frequently happen that retrogression is recommended rather than reform.

In spite of object lessons on every hand, we have not yet fully grasped the fact that efficiency in State forestry can be obtained only by giving the work into the hands of efficient foresters and keeping it there. Whatever may be said of the possibilities of partisan political government along other lines, politics and forestry will not mix. A political forester, without technical knowledge of his subject, is as hopelessly out of his element as a fish on dry land. His principal concern is to make believe to accomplish something—he is never quite sure what—and to continue to bluff as long as there is a salary to draw or other perquisites in sight. When he has exhausted the patience of the public, it is time to regain popular favor by recommending the abolition of the work as a measure of economy and efficiency.

Take a concrete case. In 1893 New Hampshire created a forestry board composed of political appointees who had the bestowal of a secretaryship at a salary of \$1,000 per year. This sum promptly became the perquisite of a prominent politician residing in Concord, who continued to draw it for sixteen years without rendering any practical return. Finally, rendered uncomfortable by the rising tide of interest and criticism, he sapiently suggested that the entire board, with its paid secretary, be abolished and the duties of the office turned over to a clerk in the Department of Agriculture. Thanks to the services of former Governor Robert Bass and others, this suggestion was vetoed, the board was renovated, and for the first time a technically educated man employed as forester. That was in 1909. In the six years following, and in spite of a desperate and unsuccessful attempt to reorganize the forester's office so as to restore its original status as a political plum, the board has retained the State forester, and the policy of the State has been crystallized into definite achievement. Among the results obtained are State-wide fire protection, the control of railroad fires, a State forest nursery, State forest reserves, and the preservation of the Crawford Notch at a cost of \$110,000.

We do not obtain efficiency in great State enterprises like the construction of highways or canals by permitting the work to become the plaything of party politics. The trained engineer must be in charge, or waste is inevitable. It is equally absurd to hope to raise the edifice of a State forest policy on the foundation of practical politics. No civilized nation but ourselves



would even consider such a possibility. Forestry in every Continental country is controlled by men specially fitted by long training, based on technical preparation, and promotion is by efficiency alone. It is true that in our hit-or-miss wasteful system we are apt to regard men as capable of turning readily from one occupation to another, and of jumping in and out of forestry to suit the vicissitudes of political changes or the whims of nontechnical bosses, but no enduring work in State forestry will ever arise until the profession rests on a basis so sound that men of more than average ability can undertake State work as a life job, secure in their positions as long as they deliver the goods. A State which is unwilling to segregate its forestry work from politics and provide for a permanent constructive policy is wasting time and money meddling with the subject.

How is this segregation to be obtained? Experience covering two decades has shown the best method of accomplishment. The program has both positive and negative injunctions.

First. Create a forestry board, composed of men selected for their interest in or knowledge of forestry.

Second. Do *not* have the Governor as a member of this board. He is too closely affiliated with partisan politics. He may appoint the board, but should be aided by advice of an authoritative character on the part of State forestry associations or other bodies.

Third. Make this board responsible for selecting and appointing the State forester, and provide that he shall be technically trained.

Fourth. Do *not* place this appointive power in the hands of the Governor. In three different States in which this latter arrangement is in force successive Governors, although charged by law to select only a technically trained man for this office, have overridden the law and appointed men not only without such training, but in some instances with no knowledge, capacity or desire to perform the duties of the office.

Fifth. Do not appoint the State forester as a member of this board, but let him act as their executive agent and secretary. Where a State forester is appointed by the Governor and is a member of a board, the board is too often reduced to a position of impotency, and can exercise no effective check upon the executive. No really efficient forester fears the control of such a board, but rather welcomes it. Many important problems arise, and often matters of policy, which call for strong action. An able and conscientious board can either take the responsibility for a policy which would otherwise embarrass the forester or can restrain his desires should they prove too radical.

With a healthy and organized public sentiment to make sure that proper appointments are made to such a forestry board, the maximum of efficiency is possible. This plan is not a theory evolved in the brain of some professor of forestry; it is the concrete result of practical demonstration in the laboratory of American poli-

tics. The States which have attempted something in forestry and failed are those which have made one or more of the mistakes in organization indicated above. The States which have limped where they should run are those which have been handicapped by some form of political influence which thwarted the free play of the ability of technical foresters. The States where forestry has in the past decades made substantial strides in public favor and in actual achievement are without a single exception indebted to the work of technical foresters for most of this progress, either in a major or subordinate capacity or by example.

These principles need all the greater emphasis because of a flank attack which lately has been gathering momentum under the banner of efficiency and economy. It has become the fashion to effect consolidations, reduce the number of commissions and State departments, and thus secure substantial saving in executive machinery. This conception, admirable in itself, when it is brought to bear on forestry, tends to seek out other State departments of a more or less kindred nature and to consolidate them under one head. Subject to such amalgamation are park, water supply and fish and game commissions, State geological survey and State conservation commissions. The term conservation in effect serves as a catch-all in which to dump various State activities, whether or not they belong together.

Again, we base our opinion of this process not on the theory of efficiency which dictates it, but upon its practical results. If for efficiency we require the subordination of the forest policy and interests to those of commissioners far more interested in the preservation of wild life, or the regulation of State water powers, we will secure perhaps a saving, but not a forest policy. The State of Louisiana has waited patiently for several years for the appointment of a forester by the State Conservation Commission, and at date of writing the commission is still promising to take this action in the near future.

Such consolidations defeat their own ends. The principle is wrong from top to bottom. State forestry must not be consolidated with a miscellaneous assortment of conservation interests, but must stand or fall as a clean-cut and separate proposition, judged on its own merits, financed with its own funds, and managed by its own board and executive. Then, and then only, will we be on the road to successful demonstration that we can do in this country with our wild lands what every other civilized nation has been doing for the last century—produce continuous and paying crops of commercial timber.

AMERICAN FORESTRY FREE

Have you friends who love trees, woodlands, forests? Send their names and addresses to the American Forestry Association.

A free copy of American Forestry will be sent them with your compliments. Do it now before you forget.

WHAT THEY SAY ABOUT "AMERICAN FORESTRY"

"I wish to say the AMERICAN FORESTRY has improved in every department during the last year and your plan of taking up each species separately in both hard and soft woods is the right idea."

R. J. COLVIN,
President, Colvin-Fleming Lumber Co.,
12 Norway Park, Buffalo, N. Y.

"Permit me to commend the monthly publication of the Association. It appears to me to be in every respect admirable. I regard it as an especial privilege to be associated even to a limited extent with the enterprising young men who are responsible for this publication. I wish to congratulate you especially for the energetic and effective part you have taken in this enterprise."

R. S. WOODWARD,
President, Carnegie Institution of
Washington, Washington, D. C.

"I like the new magazine so well that it is a pleasure to recommend it to my friends, which I am doing strongly,—with what success I cannot say. Will be glad if my efforts gain one member. A member gotten now will always stick, for the incentive is surely great."

W. W. GOODYEAR,
Carlisle, Pennsylvania.

"I have always been especially pleased with your aggressiveness as typified in the new and splendid improvements in your magazine. It is expressive of all that you stand for in the great work of forestry in our country."

JACOB M. HOFFMAN,
Johnstown, Pennsylvania.

"I take pleasure in writing of my appreciation of the AMERICAN FORESTRY MAGAZINE."

MISS C. T. LAWRENCE,
Stockbridge, Mass.

"Permit me to congratulate you on the improved appearance of AMERICAN FORESTRY."

E. F. SANDBERG,
Chicago, Illinois.

"Permit me to congratulate you upon the great improvement in the appearance and contents of AMERICAN FORESTRY. The magazine has now become thoroughly worth while and the credit for this belongs to you."

PROF. A. B. RECKNAGEL,
Ithaca, N. Y.

"I prize the magazine highly."

NICHOLAS E. CROSBY,
Pine Hill, Ulster Co., N. Y.

"We commend and wonder at the far-reaching and teaching improvements of your work."

GEORGE A. GODDARD,
Boston, Mass.

"The change of plan and scope of purpose of the AMERICAN FORESTRY MAGAZINE is manifesting itself. You are getting out splendid issues. A long reach to your arm and success to your efforts!"

CARL BANNWART,
Secretary, Shade Tree Commission,
Newark, N. J.

"We think AMERICAN FORESTRY exceedingly interesting. It is read eagerly each month by a large family and we interest all we can to become members."

MRS. M. LETCH,
Poughkeepsie, N. Y.

"Your magazine, in my opinion, is very attractive and interesting. The articles are well written and the illustrations beautiful."

MISS ALICE M. LONG,
573 Considine Avenue,
Cincinnati, Ohio.

"I would like to add my small word of approval and congratulations for the very marked improvement of the last few numbers of the AMERICAN FORESTRY, especially of the photographs."

JOSHUA A. COPE,
Coeur D'Alene, Idaho.

"I think the magazine is something of which we can justly be proud and we all ought to do our part toward improvement."

H. L. CHURCHILL,
Forester, Glenn Falls, N. Y.

"The magazine has been much improved lately; it is fine."

EMANUEL FRITZ,
Federal Building,
Missoula, Montana.

"The magazine is certainly fine."

R. E. BENEDICT,
Victoria, B. C.

"The last number of the magazine is most exceptional and full of very interesting items. Items being shorter, newsy and of more variety."

CHARLES N. DIETZ,
Denver, Colorado.

"I find the magazine very interesting and instructive, from both the technical and lay point of view. To my mind it has been steadily improving, month by month."

MRS. F. H. MILLEN,
Ithaca, N. Y.

"AMERICAN FORESTRY is coming to the front and should have the support of all forestry people. The pictures are fine."

R. C. HUEY,
Hot Springs, Arkansas.

Canadian Department

BY ELLWOOD WILSON
Secretary, Canadian Society of Forest
Engineers

The main features of January were the meetings in Ottawa of The Commission of Conservation, The Canadian Forestry Association, The Canadian Society of Forest Engineers and the Canadian Lumbermen's Association. The Dominion Conservation Commission, besides papers on other different aspects of conservation, had three papers on Forestry, the report of its forester, Mr. Clyde Leavitt; one by Dr. Fernow on "Silvicultural Problems of Forest Reserves"; one by the director of Dominion Parks, on "Forest Fire Protection in Dominion Parks," and one on "Fire Protection from the Standpoint of the Private Timber Holder."

The meeting of the Canadian Forestry Association was a very interesting one; a most interesting paper, illustrated by slides, was read by W. R. Brown, of Berlin, N. H., on the woods operations of his company and on the by-products manufactured by them from waste materials. Probably the most interesting product is "Kream," a substitute for lard in cooking, which is purer, more wholesome and more economical. He said he had nine chemists constantly at work trying to discover new uses for materials now wasted at their plants. This firm is a pioneer in the new efficiency methods and in scientific management of the highest type.

Mr. S. L. de Carteret, president of the St. Maurice Forest Protective Association, gave an interesting talk on the work of that institution, and Mr. E. J. Zavitz, forester for the Province of Ontario, read a paper on his work of reforesting drifting sands, waste lands and the distribution of trees to farmers and also spoke of his work in combating tree diseases.

The meeting of the Canadian Society of Forest Engineers was the largest ever held. It began with a "get-together" dinner, after which the business meeting was held, a new type of tree caliper, the invention of one of the members, was shown, and then a general discussion took place on the methods best adapted to the handling of the new forest survey of New Brunswick, about to be begun under the direction of Mr. P. Z. Caverhill, a member of the society. Among the guests of the evening were Dr. Bates and two members of his staff from the Dominion Forest Products Laboratory in Montreal. Mr. Gutchess, director of the New York State Ranger School, was also among the members present.

The meeting of The Canadian Lumbermen's Association was largely attended and much interest was shown. The question of using Norway pine for wood paving blocks aroused much interest.

Mr. P. Z. Caverhill has finally completed his arrangements for taking charge of the forest survey of New Brunswick and will begin his work shortly.

The annual meeting and dinner of the St. Maurice Forest Protective Association took place at the Windsor Hotel in Montreal on Thursday, February 10. This was the fourth annual meeting and the Association can justly be proud of its record.

A postal card has been received from H. R. MacMillan, British Columbia's chief forester, from Mombasa, British East Africa. He says that there is plenty of woodland but no merchantable timber. Mr. MacMillan is going next to India and then to China and Japan in the interest of the wood-using industries of his province.

The Northern Electric Co. of Montreal, had a very interesting exhibit of telephones for forest use. They have gotten out a new portable phone like those prepared for the U. S. Forest Service and also an iron box containing a telephone outfit which can be fastened on a tree. This will be great aid in fire protection.

It is said that in the spring the Norwegian Government will send a party of foresters to Canada to investigate forest conditions.

Mr. A. Holmgren, of Ostersund, Sweden, formerly in charge of the Government Ranger School at Bispagarden, has just published a book. Mr. Holmgren made a trip through Canada about three years ago and is one of the leading foresters of Sweden.

The New Brunswick Railway Company, at the suggestion of their forester, R. R. Bradley, will begin planting operations in the spring.

Sr. Don Ricardo Codorniu, editor of *España Forestal*, is doing work of which his country, Spain, should be justly proud. His journal is already one of the best gotten up of the European papers, and the articles are of great interest.

Mr. W. C. J. Hall, chief of the Forest Protection Branch of the Quebec Department of Lands and Forests, is advocating the use of aeroplanes for fire detection in the woods. There is no doubt that this is the ideal method and easy to use on account of the large number of lakes and rivers.

It is reported that there is an outbreak of white pine blister rust in Maine and

traces of it in Ontario. This is bad news, and it is to be hoped that the authorities will act promptly to suppress it before it assumes large proportions. This will also be the most economical procedure.

Mr. R. O. Sweezey, consulting forester of Montreal, and at present serving as instructor at the Royal Military College at Kingston, Ont., has been elected an associate member of the Canadian Society of Forest Engineers.

A most interesting monument is being erected to the memory of Herzl, a prominent Zionist. He did much to better conditions in Palestine and to forward the Zionist movement, and his friends are planting a grove of ninety thousand olive trees to commemorate him and his work. A far better monument than a statue.

Mr. G. C. Piché, chief forester of Quebec, has been very successful with his sales of stock from the Government Nursery at Berthierville, one sale of two hundred and fifty thousand trees having been made to one firm. A graduate of his school, Mr. Gareau, has been engaged as forester by Mr. Snowball, head of one of the largest New Brunswick lumber companies.

Mr. A. E. Warren, assistant to the general manager of the Canadian Northern Railway System, has a very interesting article in the last number of the *Canadian Forestry Journal*, describing the methods of fire protection on their lines. The Canadian Northern has attacked the problem of railroad fires with vigor and deserves much credit.

The Great Eastern Railway of England has recently, at the request of the British Columbia Government, carried out some experiments with Douglas fir and red cedar ties alongside of ties obtained from the Baltic. These timbers showed great superiority over those from Russia and it is hoped that the English and Indian railways will take their supply from western Canada.

The Canadian Forestry Association has inaugurated a free cut and cartoon service to all the newspapers in Canada to aid in its propaganda work. These are being gladly received by the newspapers, and will be a great help in educational work. Nothing strikes the eye and attracts the attention like a good picture and the impression is superior to columns of print.

The Forester's Club of Ottawa, at the last meeting, tried an innovation which was very successful, inviting forest administrators and lumbermen to attend. This was very successful and will be continued, as such meetings do much to bring the lumbermen and the foresters into closer touch and show them how much they really have in common.

British Columbia Notes

Victoria, B. C.—The investigation now being made by the Federal Trade Commission into the conditions of the lumbering industry has brought out in an emphatic way the opinion held by American lumbermen that far more is being done to help the industry on the British Columbia side of the boundary than in the United States.

"British Columbia," stated counsel at the recent hearing at Washington, D. C., "is laying the foundations of a preferential tariff. An active virile commonwealth producing the same commodity and competing in the same markets is aiding its own lumber industry in every reasonable way. Officials there are progressive and awake to the opportunities of the day."

The brief filed with the Commission by the West Coast Lumber Manufacturers Association states: "There is no question as to the British Columbia Governmental policy toward the industry. It appears in every law and in every act. The attitude of the Forest Branch is best expressed by its representative: 'It is our business to help the industry in every possible way. We are practically in partnership with it.' This extends not only to export, but to domestic trade as well. The entire subject is handled methodically and intelligently with the fixed and definite purpose of furthering and fostering the industry in every possible way."

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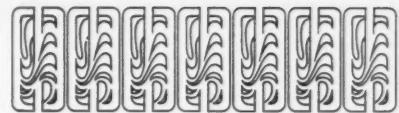
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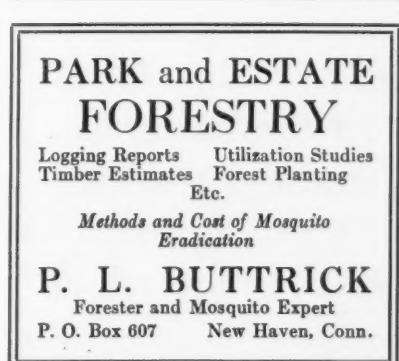
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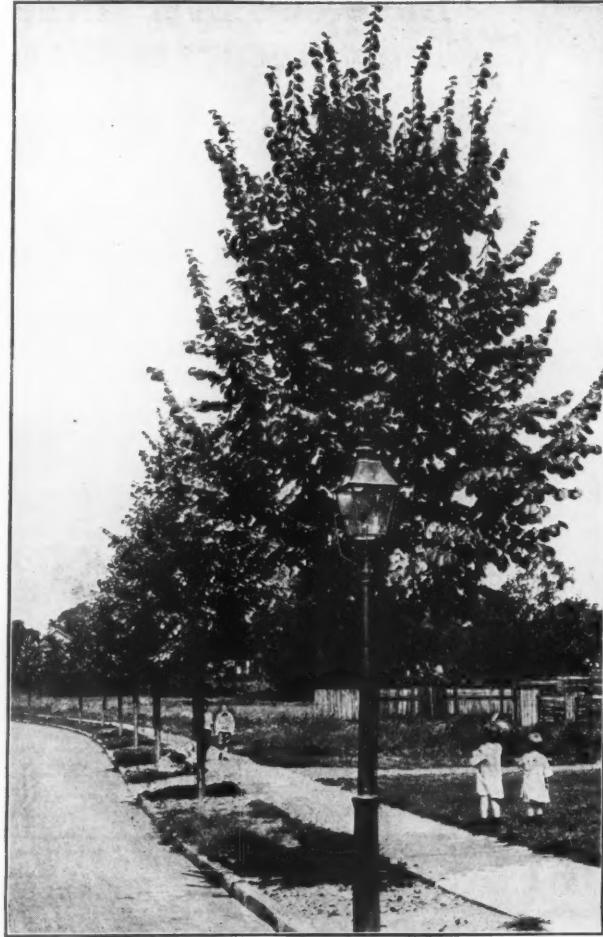
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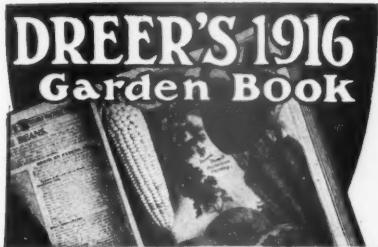
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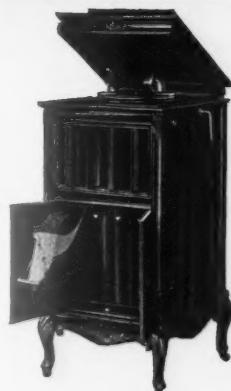


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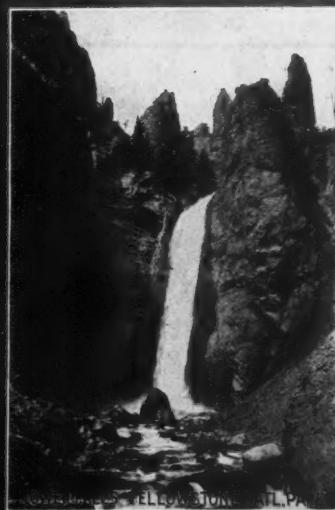
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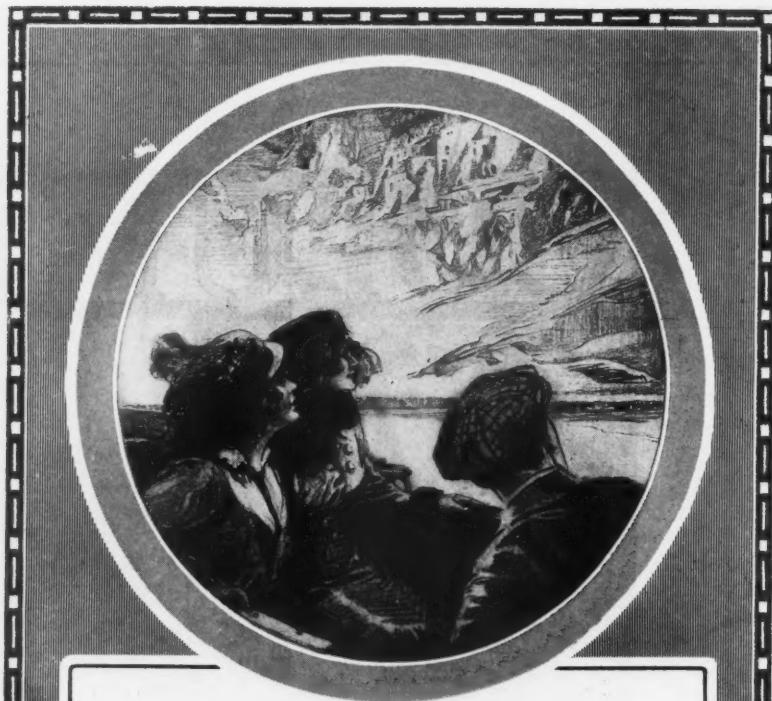
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COMPLETE four-year undergraduate course in theoretical and applied forestry leading to the degree:

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Pennsylvania State College
State College, Pa.**

Yale University Forest School

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YALE University Forest School is a graduate department of Yale University. It is the oldest existing forest school in the United States and exceeds any other in the number of its alumni. A general two-year course leading to the degree of Master of Forestry is offered to graduates of universities, colleges and scientific institutions of high standing and, under exceptional conditions, to men who have had three years of collegiate training, including certain prescribed subjects. Men who are not candidates for the degree may enter the School as special students, for work in any of the subjects offered in the regular course, by submitting evidence that will warrant their taking the work to their own advantage and that of the School. Those who have completed a general course in forestry are admitted for research and advanced work in Dendrology, Silviculture, Forest Management, Forest Technology, and Lumbering. The regular two-year course begins the first week in July at the School camp near Milford, Pennsylvania.

For further information
address

**JAMES W. TOUMEY, Director
NEW HAVEN CONNECTICUT**

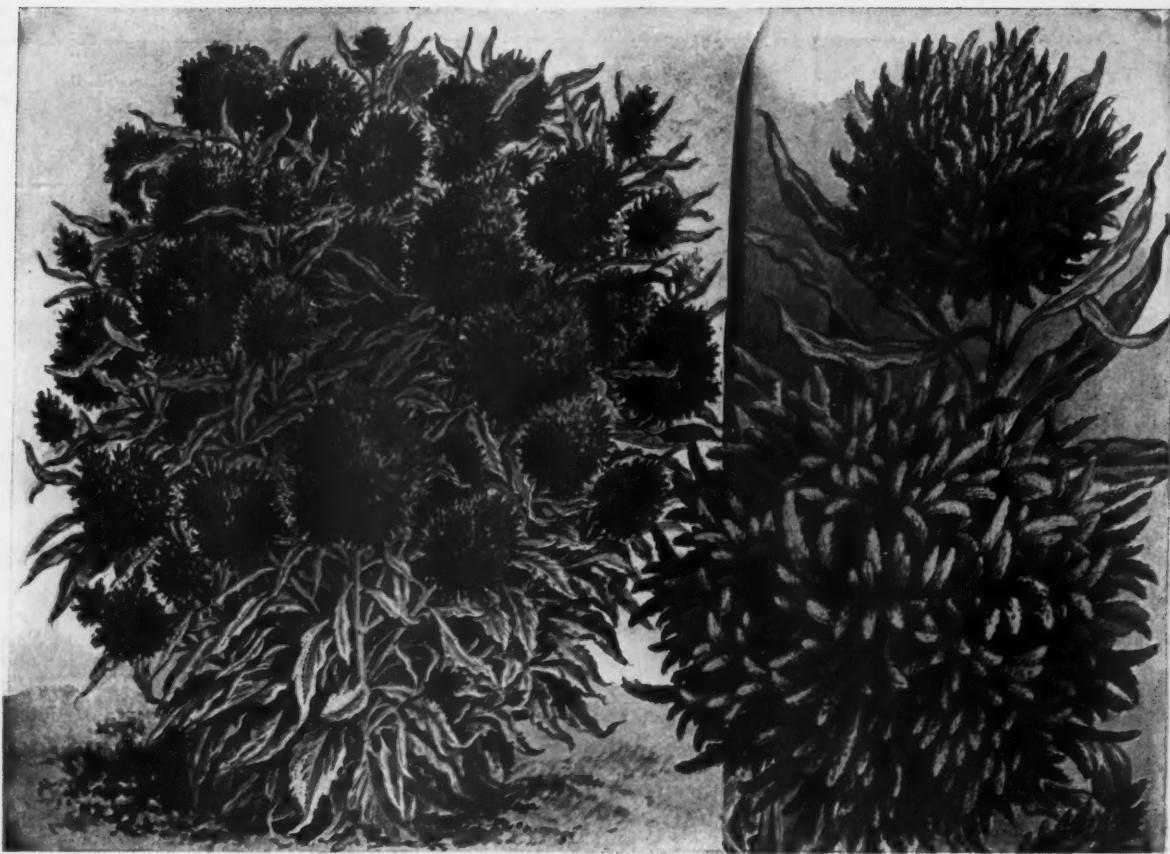
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